

2014 Student Research and Internships



Belinda Cheeseboro (Senior BS Physics/Mathematical Studies) spent her summer at the Kitt Peak National Observatory in Arizona, using data from the WISE All-Sky Database to attempt to find any noticeable effects of two types of environments—galaxy clusters and blank fields—impacting the evolution of active galactic nuclei (AGN) in the mid-infrared range (MIR). She split the clusters into two groups, gravitationally relaxed and non-relaxed, and, using code generated in *Python*, was able to create selection criteria of AGN candidates from both the clusters and the blank fields and to compare them to detect an excess or deficit in either environment. Her project title is “Multi-wavelength Selection and Characterization of AGN in Varied Environments.”

Craig Dujon (Senior BS Mathematics) works with Dr. Henson on research in mathematical biology, using discrete-time dynamical systems to model the movement of seabirds through various stages of their reproductive cycles. His models show the same intriguing self-organizing behavior as do populations of gulls observed in the wild: if a colony of nesting gulls is populated densely enough, the every-other-day egg-laying cycles of individual birds begin to synchronize--and the closer the nests are to each other, the more strongly this effect occurs. (See p. 5 for more on the work of the Seabird Ecology Team.)



Robbie Polski (Senior BSE Engineering [Mechanical]/Mathematical Studies) worked in the SURF (Summer Undergraduate Research Fellowship) Program at Yale University in the lab of Hong Tang at the Center for Research on Interface Structures & Phenomena. Dr. Tang’s lab group works in photonics and optomechanics from the electrical engineering and applied physics sides. Robbie, along with Benjamin Huber-Rodriguez, a student from Rice University, worked on a solar tracker powered by a photodiode array for off-the-grid tracking photovoltaic cells.

Summer 2013 found **Sade Samlalsingh** (Senior BS Mathematics/BS Physics) working with Dr. Gustavo Lopez-Velazquez at the University of Guadalajara in Mexico on Quantum Computation to try to build a new type of computer that can process code and solve problems much faster. Sade constructed three logic gates/qubits and utilized considerable quantum mechanics, the Runge-Kutta Method for solving a system of dynamical system in R4, and some Fortran. This summer Sade worked at Brooklyn College with Dr. Emilio Gallicchio, Assistant Professor of Chemistry, in his Computational Molecular Biophysics Laboratory, setting up a campus-wide computational grid of computers to run biochemical simulations on the binding of four mutant cyfip peptides to the eIF4E protein to understand, test, and verify mutations connected with autism—all in hopes of finding a cure for it. Sade still remotely monitors the computer array for about 20 hours a week while studying at Andrews.



Isabel Stafford (Senior BS Mathematics/BS Physics) did her summer research experience at North Carolina State University in applied mathematics. According to the organizers, this is the largest REU in the country, with 47 students working on 14 projects ranging from the extremely theoretical, like finding the roots of random polynomials, to the extremely applied, as was Isabel’s project: “Multiple Beam, Permanent Magnet Focused Klystrons for the Next Generation of High Energy Accelerators.” She and her fellow REU students, Bud Denny from Arizona State and Donavin Crawford from Berkeley, worked with mentors Dr. Hien Tran of NCSU and Dr. Lawrence Ives of CCR Research to design a klystron capable of outputting 40 megawatts of power without being prohibitively expensive to build.



This past summer, **Donovan Davis** (Senior BA Economics/Mathematical Studies) interned in Chicago at a small firm called TKG & Associates, a municipal advisory firm specializing in municipal debt advisory services, mainly to help cities get the best rate on bond issuance and to provide general municipal advisory services to help cities to restructure debt and find areas to save money. The firm assembles a team of investment bankers, lawyers, and bond counselors to make sure that the client gets the best possible deal at the lowest price. As an intern, Donovan did paperwork and simple Excel data analysis, assembled statements of qualifications, and conducted research, especially on qualified energy conservation bonds. He also worked closely with the Principal/CEO, Charlotte Knight-Marshall, who helped him to learn the thought process involved in choosing team members for projects.

Ye Lim Seo (Senior BS Mathematics) worked with Dr. Oh on a project involving a space curve in which the curvature is constant and the torsion is a linear function. With Dr. Oh's guidance, Ye Lim has written a paper on her attempt to find an explicit formula for this space curve. The *American Journal of Undergraduate Research* has accepted the paper for publication, perhaps appearing in the December 2014 issue.



Jeremy Thomas (Senior BS Physics/Mathematical Studies) worked on research with Dr. Stephen Kueble's Nanophotonic Materials Group at the University of Central Florida College of Optics and Photonics in Orlando. While there, he worked on a microfabrication project that resulted in the creation of a very tiny AU globe with a 20-micron radius. By way of comparison, the width of an average human hair is 100 microns and a red blood cell 6-8 microns. Using math, Jeremy plotted the coordinates for the laser to etch them on a slide. Then he inserted the slide in acid, which removed all except the portions which the laser had etched. This process is usually used to make computer components. Check out the pictures of the globe on the Andrews University Department of Mathematics *Facebook* page.

During his final year at Andrews **William Tritch** (2014 BS Mathematics/BS Physics) worked with several professors, doing research. Utilizing functional analysis with Dr. Kang, William successfully analyzed a Lotka-Volterra model to show positive solutions to a generalized version. With Dr. Kanya Long's (Biology) and Dr. Henson's guidance, he built a model to illustrate the spread of Mayaro virus in the Peruvian city of Iquitos, a project on which he intends to continue collaborating while he is in graduate school in Texas. With Dr. Tiffany Summerscales (Physics) William worked on optimizing LIGO code to change time data into frequency data and developing some signal processing to speed up the calculations. At the MAA Undergraduate Student Poster Session at the 2014 Joint Mathematics Meetings in Baltimore in January, a committee looked at more than 310 entries and awarded 48 as being Outstanding Presentations. One of those 48 winners was the poster, "Long-term Behavior of Solutions to a Wave Equation with Degenerate Damping," presented by William and two of his fellow students from their 2013 REU at University of Nebraska—Lincoln.



Sigma XI Inductees

The seventh meeting of the Andrews-Whirlpool Chapter of Sigma Xi, the research honor society, took place February 26, 2014. **Dewey Murdick** (1999 BS Physics) presented a talk titled "Hypotheses, Experiments, and Evaluation," sharing a bit about his work for the US Intelligence Agency in which he manages high-risk, high-payout projects, one of which was highlighted in *Nature* magazine. New inductees into full membership are **Dewey Murdick, Dr. Lynelle Weldon**, and **Andre Moncrieff** (Senior BS Biology) (not pictured). Inductees into associate membership are **Robert Polski** (Senior BSE Engineering [Mechanical]/Mathematical Studies major), **Janna Quetz** (2014 BS Mathematics), and **William Tritch** (2014 BS Mathematics/BS Physics).



2014 Graduates



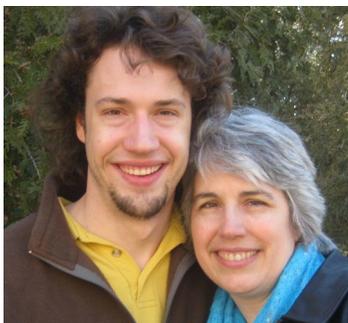
Lysandra Joelle Acre (2014 BS Mathematics/BS Biology [Molecular Biology emphasis], BBB, Phi Kappa Phi, PME) is a student missionary in Egypt, teaching mathematics at Nile Union Academy. Her ultimate plan is to become an actuary.



Bethany Conrad (2014 BS Mathematics Ed/BSLED, Phi Kappa Phi, PME) completed her student teaching at Richmond Academy in Richmond, Virginia, in the fall of 2013, then taught full-time there from January on, teaching 8th grade pre-algebra, 9th grade algebra, 10th & 11th grade geometry, and Intro to

Photography. She will be teaching mathematics to grades 6-8 at Beltsville Adventist School in Beltsville, MD, this coming year as well as serving as a mathematics support person and counselor. This summer she married **Darren Vincent** (2012 BS Airframe Mechanics).

Dana Johnston (2014 BS Mathematics, PME) continues to work as an administrative assistant for the Department of Chemistry. Already in possession of a BS and MS in Chemistry, she also teaches chemistry for the RESA Science program for area high school students. Dana started taking mathematics classes for fun and decided to finish the major, excelling in all her classes. Her husband, **Jeffery** (1983 BS Mathematics), daughter **Sereres** (2009 BS Mathematics/BS Physics, PME), and son, **Sinclair**, were all mathematics majors at Andrews.



Sinclair Johnston (pictured with his mom) (2014 BS Mathematics) has a passion to share knowledge with others and is working with City Year Miami where he will tutor at-risk students for a year. After this year of service he plans to look into other jobs or apply to graduate school.

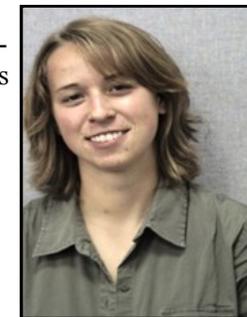
Joseph Lee (bottom left) (2014 BS Mathematics, PME) is attending pharmacy school at Roosevelt University in Schaumburg, IL.



Mateja Plantak (2014 BS Mathematics Ed/Physics Studies) began her MAT in Mathematics this summer at here at Andrews and may eventually work on a Master's in special education—especially learning disabilities in mathematics and science. Since she has been the eigen* secretary for four years, the club will especially miss her!



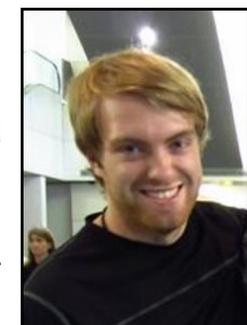
Janna Quetz (2014 BS Mathematics, PME, Sigma Xi) finished her coursework in Dec. 2013 and is living in St. Joseph with her husband, **Atniel** (2013 BSE Engineering), who works for Whirlpool. She is teaching a GRE prep class for Student Success this fall, and her ultimate plan is to become an actuary.



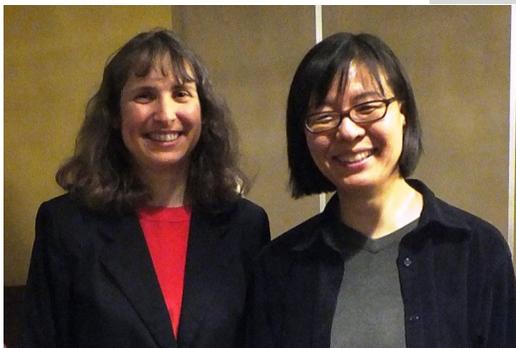
Sam Snelling (2014 BS Mathematics/BS Physics, JN Andrews Honors Scholar, PME, Phi Kappa Phi, Sigma Pi Sigma) is teaching for the Department of Physics at Andrews this year and plans to go to graduate school in physics.



Reneesha Thompson (2014 BS Spanish/Mathematical Studies) worked for the summer with at-risk students. She hopes to go to Korea to teach English and satisfy her wish to travel the world.



William Tritch (2014 BS Mathematics/BS Physics, PME, Phi Kappa Phi, Sigma Pi Sigma, Sigma Xi) began his PhD studies at Texas Tech in Lubbock, studying Applied Mathematics. He is interested in dynamical systems and mathematical epidemiology. This year he was able to attend the Joint Mathematics Meetings in Baltimore in January and was voted Association of Adventist Mathematicians Vice President for next year.



DeHaan Awards

Two senior mathematics majors, **Brandon Baptist** (Senior BS Mathematics Ed) (far right) and **Samantha Snelling** (2014 BS Mathematics/BS Physics) (right) received a DeHaan work award sponsored by Frank and Dolly DeHaan, given for outstanding performance at the workplace in the following areas: attendance, ability to take responsibility, initiative, team-player skills, human-relation skills, and work excellence. The Department of Mathematics awarded Brandon the scholarship in appreciation for his work for the department: tutoring for the remedial mathematics classes and for the Mathematics Center, grading for various professors, and teaching classes for various professors when they were gone. Samantha received her award for her work for the Department of Physics.

Who's Who in American Colleges and Universities

This year Andrews University nominated 50 students for Who's Who in American Colleges and Universities, 17 of whom were associated in some way with the Department of Mathematics. Four were BS Mathematics or Mathematical Studies majors: **Robert Polski, Samantha Snelling, William Tritch, and Jonathan Wheeler**. Ten were Mathematics minors: **Brian Booth, Ricardo Huancaya, Andrew Kutzner, Nina Lassonnier, Larry Mendizabal, Andrew Roderick, Jason Ruiz, Jacina Shultz, Stefan Von Henner, and Thomas Zirkle**. Two were biology majors who worked with Dr. Henson's Seabird Ecology Team: **Matthew Chacko** and **Andre Moncrieff**. And the last student was a biology/biomedical major who worked in the department for several years as a remedial mathematics tutor/proctor: **Philippe Stanier**.



Andrew Kutzner (2014 BS Biology [Biomedical]/Mathematics minor; Phi Kappa Phi, PME) was one of 19 Andrews students accepted into the freshman class at Loma Linda School of Medicine.



Also on the list was **Philippe Stanier** (2014 Biology [Biomedical]), who worked as a mathematics tutor and proctor for the department for several years and graded for RESA Mathematics.

Promotions

Congratulations to Dr. Oh and Dr. Weldon on receiving tenure this spring and to Dr. Weldon on becoming an Associate Professor. To honor these achievements, all of our current faculty and emeriti celebrated at a special dinner in the Lincoln Room of the cafeteria. (For more photos, see our Andrews University Department of Mathematics *Facebook* page.)



Students sitting in the new chairs in front of the Diethard Pallaschke book collection.

Remodeling Project Completed

In December 2013 the remodeling work on the Mathematics Commons was completed, allowing students to relax and study in a room with new chairs and study carrels. In addition to new furniture in the commons, in the chair's office, and in the main office, we added fifteen poster frames to the hallway, handmade of cherry wood by Dr. Steen (Biology). Another change was to move the reader room to the old Seabird Team office to free an office for Ms. Umlauf and to move the Seabird Team to room 119. Come to see our changes when you can!

To keep in touch with the Department of Mathematics between newsletters, go to <https://www.facebook.com/pages/Andrews-University-Department-of-Mathematics/135554453219757> You don't have to be signed up on *Facebook* to view the site. On this site you can see current as well as past photos, and if you have some photos or news to share on the site or in a future newsletter, send them to math@andrews.edu to help us to keep in touch.

Henson and Hayward Receive New NSF Grant

Drs. Henson and Hayward received a 5-year NSF grant which begins September 1, 2014, and runs through August 2019. Collaborative with the University of Arizona, with Andrews as the lead institution, and jointly funded by the NSF Division of Mathematical Sciences (DMS) and the Population & Community Ecology Program of the Division of Environmental Biology (DEB), the project is titled “Climate Change, Cannibalism, and Reproductive Synchrony: The Effect of Food Shortages on Life History Strategies of Marine Organisms.”

The Seabird Ecology Team has benefitted from NSF funding since 2003, providing research opportunities for roughly 50 undergraduate and graduate students, but in this grant cycle the team is shifting its focus to the effects of climate change on life-history strategies of colonial seabirds. Having a five-year grant (instead of the usual three-year period) will enable the team better to test hypotheses about the effect of climate change on the study system by using the climate variability associated with El Niño cycles.

In particular, the team plans to look at cannibalism as a response to the reduced food supply associated with rising sea-surface temperatures and at the possible role of ovulation synchrony as an adaptive response to cannibalism. Higher temperatures associated with climate change can precipitate changes in marine food webs, resulting in a diminished food supply for top consumers. One observed consequence is cannibalism, which, in turn, can lead to a variety of ecological and evolutionary consequences. El Niño events mimic features of long-term climate change on short-time scales, allowing for tests of some climate-related hypotheses in marine systems. The principal investigators will examine the impact of climate-change-related food shortages on life-history strategies both theoretically, using mathematical models, and empirically, at a large colony of seabirds that function as important indicator species.

Through public lectures, interviews, and a Web site through which they disseminate data and information, Henson and Hayward hope to raise the awareness of the general public and wildlife managers about this work, the results of which have important implications for the management of natural populations responding to climate change.

A significant portion of the funds in this grant are earmarked for student research and travel, enabling undergraduate research students to receive NSF Research Experience for Undergraduate (REU) stipends. The grant also will support student attendance at professional meetings and provide team members with a wealth of new opportunities as they receive cross-disciplinary training in mathematical biology. Students become involved at every stage of the research process, from data collection to model construction and analysis to joint authorship of peer-reviewed publications.

The team’s NSF program officer praised the project, saying, “The DEB program officers were particularly enthusiastic about this project and agreed that this proposal warrants funding.” Comments from other reviewers on NSF panel included statements such as “Very strong,” “Highly original,” “Well organized,” “I do not see any weakness,” and “Beautiful piece of new and insightful interdisciplinary research.”



The students currently doing active research on the Seabird Ecology Team this semester include mathematics major **Craig Dujon** (lower left) and Biology majors (left to right) **Saharsh Dass**, **Zachary Reichert**, **Wadenerson Saint Martin**, **WayAnne Watson**, **Ashley Reichert**, and **Sumiko Weir**, along with Drs. Henson and Hayward, Dr. Atkins, Dr. Weldon, and **Amanda Sandler** (2013 MS Biology) (lower right).



Talks**Faculty Research**

- Henson, S. M.** "Reproductive synchrony in populations can ameliorate the effects of adult-on-juvenile cannibalism." Michigan Academy of Science, Arts & Letters Conference, Mathematics Section, Oakland University, Rochester, MI, February 28, 2014.
- Henson, S. M.** "Reproductive synchrony in populations can ameliorate the effects of adult-on-juvenile cannibalism." Joint Mathematics Meetings, AMS Special Session on Mathematics in Natural Resource Modeling Baltimore, MD, January 17, 2014.
- Henson, S. M.** "Bifurcation of synchronous ovulation cycles in colonial birds." American Mathematical Society, Fall Southeastern Sectional meeting, special session on Mathematical Models in Biology and Physiology, Louisville, KY, October 6, 2013.
- Henson, S. M.** Colloquium, Rosario Beach Marine Laboratory, Anacortes, WA, July 24, 2013.
- Henson, S. M.** Public lecture for "Cape George University" lecture series, Cape George, Port Townsend, WA, May 22, 2013.
- Henson, S. M.** "Coadaptive dynamics of cannibalism and ovulation synchrony: A discrete-time mathematical model." Conference to Honor Tom Thompson and Ken Wiggins, Walla Walla University, Walla Walla, WA, May 17, 2013.
- Henson, S. M.**, "Chaotic dynamics and lattice effects documented in experimental insect populations." Colloquium, Departments of Mathematics and Biology Albion College, Albion, MI, May 2, 2013.
- Kang, J. H.** "Sufficient and necessary conditions for existence of positive solutions for a general elliptic model." Michigan Academy of Science, Arts & Letters Conference, Mathematics Section. Oakland University, Rochester, MI, February 28, 2014.
- Kang, J. H.** "Coexistence steady state solutions to general population model." Joint Mathematics Meetings. San Diego, CA, January 10, 2013.
- Kang, J. H.** "Coexistence condition of two species of animals residing in an environment." Joint Mathematics Meetings. Baltimore, MD, January 17, 2014.
- Kang, J. H.** "Steady state solutions to general population model." Michigan Academy of Science, Arts & Letters. Hope College, Holland, MI, March 22, 2013.
- Moore, R. C.** "Maxima and minima without calculus." Invited talk for the induction ceremony of the Michigan Gamma Chapter of Pi Mu Epsilon, the National Mathematics Honor Society, Andrews University, Berrien Springs, MI, April 10, 2014.
- Moore, R. C.** "What constitutes a well-written proof?" 17th Annual Conference on Research in Undergraduate Mathematics Education, Denver, CO, February 2014.
- Savic, M., **Moore, R. C.**, & Mills, M. "Mathematicians' views on transition-to-proof and advanced mathematics courses." 17th Annual Conference on Research in Undergraduate Mathematics Education, Denver, CO, February 2014.
- Moore, R. C.**, Savic, M. & Mills, M. "Transition to proof and beyond: What's needed for success?" Poster presented at the Fifth Annual Celebration of Research & Creative Scholarship, Andrews University, Berrien Springs, MI, November 1, 2013.
- Oh, Y. M.** "Riemannian submersion invariant and theta-slant submanifolds," Michigan Academy of Science, Arts & Letters Conference, Mathematics Section, Oakland University, Rochester, MI, February 28, 2014.
- Oh, Y. M.** "An inequality on Riemannian submersion and theta-slant submanifold." American Mathematical Society, Fall Western Sectional Meeting. UC Riverside, Riverside, CA, November 2-3, 2013.
- Oh, Y. M.** "Some inequalities on Riemannian submersion and isometric immersions." Joint Mathematics Meetings, General Contributed Paper Session: Research in Geometry and Linear Algebra, Baltimore, MD, January 16, 2013.
- Prince, M.** "Hands-on inferential statistics with the TI-Nspire." MichMATYC 2014 Conference. Lake Michigan College, Benton Harbor, MI, October 4, 2014.
- Prince, M.** "Hands-on inferential statistics with the TI-Nspire." MCTM, Holland, MI, August 1-2, 2014. **Prince, M.** "STEM Activity: Using the CBR and the TI-Nspire." Teachers Teaching with Technology 2014 International Conference, Las Vegas, NV, March 7-8, 2014.
- Prince, M.** "STEM activity: Using the TI-Nspire to develop the Common Core mathematical practices" and "Using the TI-84+C to teach mathematics." Math In Action, Grand Rapids, MI, February 22, 2014.
- Prince, M.** "Inferential statistics using the TI-Nspire CX." DACTM-DSTA Joint Conference, Detroit, MI, November 16, 2013.
- Prince, M.** "Using the TI-73 to teach the Common Core mathematical practices" and "My favorite activities now in color--TI-84+C." MCTM, Traverse City, MI. July 31-August 2, 2013.
- Weldon, L.** "Remedial math journeys." Michigan Academy of Science, Arts & Letters Conference, Mathematics Section, Oakland University, Rochester, MI, February 28, 2014.
- Weldon, L.** "Hot and bothered III: Climate change, cannibalism, and ovulation synchrony." Fifth Annual Celebration of Research & Creative Scholarship, Andrews University, Berrien Springs, MI, November 1, 2013.
- Refereed Journal Articles** (*names in italics are student coauthors*)
- Burton, D., & Henson, S. M.* (2014). A note on the onset of synchrony in avian ovulation cycles. *Journal of Difference Equations and Applications*, 20:664–668.
- Hayward, J. L., **Weldon, L. M.**, **Henson, S. M.**, *Megna, L. C., Payne, B. G., & Moncrieff, A. E.* (2014). Egg cannibalism in a gull colony increases with sea surface temperature. *The Condor: Ornithological Applications*, 116:62-73.
- Hayward, J. L., *Megna, L. C., Payne, B. G., Velastegui Chavez, S. R., & Henson, S. M.* (2013). Temporal and environmental effects on the behavior of flightless cormorants. *Wilson Journal of Ornithology*, 125:790–799.
- Kang, J. H.** (2013). Positive equilibrium solutions to general population model. *International Journal of Pure and Applied Mathematics*, 85(6):1009-1019.
- Megna, L. C., Moncrieff, A. E., Hayward, J. L., & Henson, S. M.* (2014). Equal reproductive success of phenotypes in the *Larus glaucescens-occidentalis* complex. *Journal of Avian Biology*, 45:410–416.
- Moore, R. C.** (2013, May-June). Measuring a circle: A math lesson for grades 5-10. *Journal of Adventist Education*, 75(4):30-33.
- Oh, Y. M.** (2013). Riemannian submersions and Lagrangian isometric immersion I. *International Electronic Journal of Geometry*, 6(2):14-18.

Chair's Letter

Dear Friends,

Two questions often occupy my mind: What does following the way of Jesus mean in the twenty-first century? And what does loving God with the whole mind mean for an academic mathematician or scientist? We pondered the second question in our departmental retreat at the beginning of this school year. It is a deep question requiring lifelong reflection, and I do not know the whole answer. I have, however, been thinking about the following points.

First, loving God with the mind means that Christian academics must decide intentionally to behave as Christians in our dealings with students, staff, colleagues, and administrators. This may seem obvious, but it is completely nontrivial to anyone who takes seriously the Sermon on the Mount. This question leaves academics much to ponder, especially regarding the role of boundaries, discipline, and accountability in the compassionate mentoring of students.

Second, loving God with the mind means being the best teachers and mentors possible as we challenge students to appreciate the world of ideas and nature and as we prepare them for future success. While leading students to the current limits of human knowledge, we are pastors who affirm not only the joy and freedom of learning but also the deep, resilient faith that gives meaning to learning and creativity. We ourselves must understand thoroughly, and then help students to understand, the scope and limits of mathematical and scientific methods, the integrity with which the Christian approaches ideas and data, and the deep value with which the Incarnation affords nature and observation.

Third, loving God with the mind means being the best scholars possible, doing the best mathematics and science possible, for God's honor. This involves conducting first-rate research with utmost integrity and building credibility within the discipline. It involves mentoring students to do the same. Every research paper and presentation comes from both the mind and the heart, *Soli Deo Gloria*. For the Christian scholar, mediocrity is not an option.

Clearly the life of the teacher-scholar is a calling, a vocation, and not simply a career. We conduct every part of that life for the sake of Christ.

May our passion for learning and creativity, and our astonishment at the deep structure of nature, inspire awe and worship in us and in our students. May our commitment to Christ lead us to the best of thinking and doing.

Shandelle Henson
Chair

First Annual SciFest

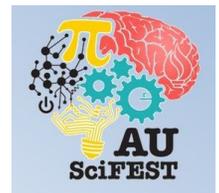
On November 14-17, 2013, thirty students from several academies attended the first annual SciFest hosted by the STEM departments and the Lake Union and coordinated by STEM recruiter, Rachel Boothby. Each STEM department led a student activity related to the theme "Discover Design," focusing on eggs and their properties. On Friday, the students calculated problems concerning egg production, found an egg's density, dissected fertilized and unfertilized eggs, and designed and built a container with which teams could safely drop an egg from the top of the Science Complex. While the students were occupied, the nine academy teachers met with Drs. Henson and Weldon to discuss high school math preparation.

On Friday night and Sabbath morning, professors led discussions on God's design, and Dr. Arlyn Drew gave the sermon.

After a Sabbath afternoon walk, students used the Scanning Electron Microscope to examine articles they'd gathered. Then on Saturday night, students participated in the Quiz Bowl, answering questions as a team in the five STEM areas, and then saw a film of weekend highlights and received awards/certificates for their work.

With the theme "It's Elemental," the next SciFest is scheduled for February 19-22, 2015, and the enrollment deadline is December 19.

Students preparing their vehicle for the egg drop off the Science Complex roof.



Alumni Updates



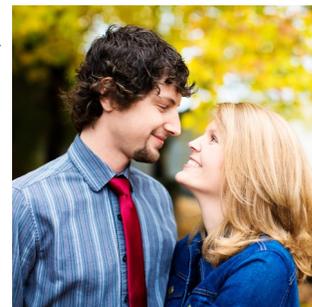
Since 2010 **Sarah (Tyman) Foote** (2009 BBA Marketing/Mathematics minor) has been a community education specialist for Capital Educators Federal Credit Union in Nampa, Idaho, in the Marketing Department, teaching financial literacy to kids at all grade levels in local schools. Sarah teaches students lessons on basic banking concepts/services and discusses money-management strategies, talking with younger kids about their dreams and letting them know that the sky is the limit if they learn how to save their money and spend it wisely. She also helps high school students work through the intricacies of college expenses and real-life financial responsibilities. In addition, she holds four two-day financial literacy camps each summer and schedules about six budgeting simulations a school year. She has been married to **Kyle Foote** (Multimedia Arts) since August 2009, and the couple had their first baby, a boy, a few months ago.

Chantel Blackburn (2006 BS Mathematics, PME) successfully defended her PhD dissertation on November 24, 2014, at the University of Arizona Tucson. Dr. Blackburn is an Assistant Professor of Mathematics, who has been teaching mathematics at Pacific Union College since Fall 2013, with a teaching load that includes developmental algebra courses, a mathematics course for elementary education majors, introductory statistics, differential equations, logic and sets, and biomathematics and mathematical modeling on alternating years. Outside of teaching, she enjoys playing clarinet with the college Symphonic Wind Ensemble, taking walks with friends, spending time with her two cats, playing video games, and reading. She will be making her acting and musical debut in February 2015 as Snoopy in PUC's Dramatic Arts Society production of *You're a Good Man, Charlie Brown*.



Danielle Burton (2008 BS English Literature/Mathematical Studies; 2013 MS Mathematics & Science, PME), a second-year PhD student at the University of Tennessee, Knoxville, received the Graduate Student Achievement and Scholarship Award for 2014 for outstanding academic achievement in the UTK Department of Mathematics. Another accomplishment has been the publication of her thesis, "A Note on the Onset of Synchrony in Avian Ovulation Cycles," in the *Journal of Difference Equations and Applications* (2014). This article won the Mathematics Article of the Week award from Taylor & Francis. In October 2014, Danielle returned to Andrews to give an eigen*Talk and to counsel students on how to navigate grad school applications.

Darren Heslop (2010 BS Photography/Mathematics minor) is a Web designer/developer and photographer for Integrated Marketing & Communication at Andrews University. He married **Cassie Unruh** (2013 BS Animal Science) on June 29, 2014. Cassie was the Task Force librarian at Great Lakes Adventist Academy last school year.



Andrew Hoff (2011, BS Physics/Mathematics minor, PME, Sigma Pi Sigma, Sigma Xi) has recently published an article with his colleagues at CalTech in the *Proceedings of the National Academy of Sciences*, "Compositional Landscape for Glass Formation in Metal Alloys." The article details a new and improved set of Ni-based bulk metallic glasses and explains glass forming ability (GFA) as a function of two experimentally accessible parameters: liquid fragility and reduced glass transition temperature. Their research allows for better explanations of the mechanisms of GFA in metallic glasses. Andrew presented a talk at the Andrews Research Conference this past May.

Jeffrey Howson (2010 BSE Engineering [Mechanical]/Mathematical Studies) finished his M.S. in Engineering Management at the New Jersey Institute of Technology, January 31, 2014, earning three graduate certificates: Project Management, Engineering Leadership, and Management of Technology. Jeffrey married Chinyere Blanton on January 20, 2013.





Sereres Johnston (2009 BS Mathematics/BS Physics, PME), a PhD student at the University of Massachusetts, was featured in an online article by the UMAss Physics Department. In her research as part of the EXO-200 collaboration, which uses a detector located in a salt mine in New Mexico, Sereres is looking for “rare nuclear decays” providing insight into the nature and mass of neutrinos,” and at UMass she is working on constructing a test-bed cryostat system. (For more information see the article at <http://umassphysics.tumblr.com/post/81317270354/umass-physics-graduate-student-petite-profile>).

Philippe LeGuerre (2009 BSE Engineering [Electrical and Computing]/Mathematical Studies) was sworn in as an attorney and counselor at law in New York on March 19, 2014, after finishing his degree in law at Benjamin N. Cardozo School of Law. During his summers at law school, he interned in Rio de Janeiro, in New York, and at the University of Paris I Panthéon-Sorbonne. Currently he works at a law firm in San Diego, specializing in intellectual property law, including patents.



Libby Megna (2010, BS Biology/Mathematics minor; 2012 MS Biology, BBB, J. N. Andrews Scholar, PME, Phi Kappa Phi, Sigma Xi) a PhD student at the University of Wyoming, Laramie, recently had an adaptation of her master’s thesis published in the *Journal of Avian Biology*. The title of the article is “Equal Reproductive Success of Phenotypes in *Larus Glaucescens-occidentalis* Complex.”



Andrea Lisa Moore (2006 MS Mathematics & Science, PME), Assistant Professor of Biology at Savannah State University, returned to Andrews to give an eigen*Talk, April 18, 2014. In her talk, “Mathematics and Beyond: Applications of Quantitative Analyses for Environmental Policy,” Dr. Moore demonstrated how, in two of her recent projects, mathematical skills and other quantitative techniques proved useful in non-mathematics fields, thereby showing how possessing interdisciplinary skills can help STEM majors carve out new areas for study.



John Musselman (2013 BS Mathematics Ed, PME) is now teaching mathematics at Blue Mountain Academy after teaching a year at Bridgman High School. His wife, **Ellen (Poirer)**, graduated from Andrews with a degree in Graphic Design and has since worked for Adventist Frontier Missions, designing their magazine and anything else from brochures to t-shirts, as well as collaborating with a team to redesign the AFM Web site.

Steve Oxley (2010 BS Computing: Computer Science Emphasis/Mathematics minor) is a software engineer at Groupon, working on a team that creates and supports tools for running multivariate experiments and analyzing them in real time, allowing configuration and execution of different site (or app) experiences, gathering user interaction data, and aggregating this data into useful metrics. In June 2014 he married Tralina Evanoff, who is a Certified Ophthalmic Assistant.



Justin Schmidt (2012 BSE Engineering [Mechanical]/Mathematics minor), currently an engineer at Parker Aerospace, returned to AU to give an eigen*Talk on August 30, 2013, telling students of job opportunities for mathematics/physics students in the corporate world. Parker Aerospace is “a global leader in the research, design, manufacture, and service of flight control, hydraulic, fuel and inerting, fluid conveyance, thermal management, and engine systems and components for aerospace and other high-technology markets.”

**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

- *Danielle Martin, President
- *Ada Alvarez, Vice President
- *Sade Samlalsingh, Sec.-Treas.
- *Prof. Joon Hyuk Kang, Advisor

eigen* Mathematics & Physics Club

- *Robbie Polski, Mathematics President
- *Dillon Zimmerman, Physics President
- *Jonathan Wheeler, Secretary
- *Erik Vyhmeister, Poster Secretary

Mission Statement

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

- *Preparing students with the mathematical understanding, problem-solving skills, and dispositions that enable them to excel in their chosen careers;
- *Increasing mathematical and scientific knowledge through publication and presentation;
- *Supporting the broader mathematics education community and mentoring others for generous service through a committed Christian life.

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Front row: (L to R) Sade Samlalsingh, James Magbanua, Danielle Martin, Michael Gruesbeck, Ada Alvarez. **Back row: (L to R)** Joseph Lee, Dillon Zimmerman, Satoshi Theile, Rufaro Musvosvi, Thomas Zirkle, Dr. Marian Prince.

2014 Pi Mu Epsilon Inductees

Dr. Robert Moore was the keynote speaker at the 2014 Pi Mu Epsilon induction, speaking on “Maxima and Minima Without Calculus.” The new PME officers for the 2014-15 school year are **Danielle Martin**, President, (Senior BS Mathematics); **Ada Alvarez**, Vice-President, (Senior BBA Management/Mathematical Studies); and **Sade Samlalsingh** (Senior BS Mathematics/BS Physics), Secretary/Treasurer.

2014 Mathematics Awards

This year the department gave 43 awards to 35 people. The scholarship winners were (clockwise from top left) **Ye Lim Seo** and **Julie Logan** receiving the Harold T. Jones Scholarship from Dr. Meredith Jones-Gray; **Robert Polski** receiving the Edward J. Specht Scholarship from Dr. Kang; and **Joelle Acre** and **Dana Johnston** receiving the Louis Ulloth Endowed Scholarship from Dr. Weldon.

