Issue
02
June 2014

Science | Technology | Engineering | Mathematics

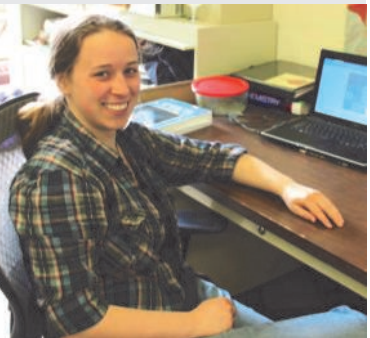
STEMconnect

Advice from Grads>>>

"If you want to be successful, strengthen your weaknesses in English, writing, and communication/people skills."
- Larry Mendizabal (Engineering)

"Explore different options besides medical ones. I came in as premed, but ended up finding out about genetic counseling, and now I'm doing that!"
- Cherie Pryce (Biology)

"Take more math. Learn how to do some programming, like MATLAB. Also, tutor a lot so you can solidify what you're learning because teaching is how you learn best."
- Sam Snelling (Physics)



Year in Review

STEM at Andrews University

Freshman Orientation:

The STEM departments - Biology, Chemistry & Biochemistry, Physics, Engineering & Computer Science, and Mathematics - coordinated their demonstrations and activities during the freshman orientation ice-cream social. These demos and activities showed unique aspects of their disciplines, and in so doing, wowed the new students and their parents.

Capturing Stories:

Throughout the year, there was greater emphasis put on capturing the stories of the STEM departments and their students. From research on burnt tofu to alumni in medical school, these stories can be found on our *Facebook* and *Tumblr* pages (www.facebook.com/andrewsstem & andrewsstem.tumblr.com).

SciFEST Recap:

Thirty academy students and nine math and science teachers came to Andrews for the first annual SciFEST, November 14-16, 2013, hosted by the STEM Division in the College of Arts & Sciences and the Lake Union Conference. Each STEM department led an activity for the students that correlated with the theme "Discover Design" and focused on eggs and their properties. On Friday, teachers from the academies met together to discuss high school math preparation with our faculty, an important discussion since math affects each of the disciplines in STEM.

The students experienced the excitement of science through activities ranging from calculating an egg's density, dissecting fertilized and unfertilized eggs, and designing/building an egg vehicle to drop from the top of the science complex. At the Quiz Bowl, students had to answer questions as a team in the six areas highlighted during the weekend. Following the Quiz Bowl was a film of weekend highlights and awards/certificates given to the teams.

The involvement of faith in science was also a highlight of the weekend, with Friday and Sabbath activities focused on God's design. Faculty led Sabbath School discussions about God's design for our lives and Arlyn Drew shared a sermon about putting God first in our scientific study. In the afternoon, students had the opportunity to bring articles from their nature walk to examine under the Scanning Electron Microscope with Dr. Denise Smith. Sabbath evening included a stars display with Dr. Kutzner pointing out the many constellations and the beauty of the universe.

Andrews Research Conference:

From May 7-11, 2014, Adventist researchers from all over the country came to our campus for the first annual ARC: Early Career Researchers in STEM, hosted by The Office of Research, to enjoy 20 presentations covering research in the STEM disciplines. Many of our faculty participated through the weekend events.

ANDREWS UNIVERSITY STEM
Science | Technology | Engineering | Math

Chemistry & Biochemistry >>>

"Nothing is too wonderful to be true, if it be consistent with the laws of nature."
~Michael Faraday

This year, our students enjoyed the weekly Chemistry Seminars in which we featured area scientists, student presenters, faculty research, and topics for career preparation. One of these seminars focused on women in science and brought three engineers from the Whirlpool Corporation to share about their careers and what led them to pursue a career in the sciences. These types of seminars, sponsored by ChemClub, National Society of Black Engineers, and Society of Women Engineers, bring together the STEM departments.

Mole day, observed on October 23 from 6:02 am to 6:02 pm, celebrates Avogadro's Number (6.02 x 1023), a basic measuring unit in chemistry. Commemorating the occasion with chips, salsa, and guacamole, ChemClub sponsored this event and gave out prizes and sweatshirts to those who attended.

Andrews ChemServices, the chemistry business run by the department, saw some changes this year as new equipment was installed. We were especially happy to acquire a large scale solvent rotovap and a cassette-style ultrafiltration system which can manage purification of molecules ranging from 2,000 MW to 100,000 MW. Prior to March 2013, we were running the business under the authority of the previous corporation, but now our department completely owns and operates the business. Andrews ChemServices synthesizes and supplies dendrimers to researchers around the world from California to Florida and Switzerland to Japan.

We enjoy celebrating the accomplishments of our students, so we hold an annual awards ceremony to recognize those that excelled in their classes. Along with enjoying good food and company, students and professors gave updates on their ongoing research projects and the department recognized our scholarship recipients.

Another celebratory event is the dinner for graduating seniors and their families (pictured top right), held during graduation weekend in the department. This event is something that students look forward to as it is one of their final memories with the faculty in the department. They also have the opportunity to share their "stomping grounds" with their family after their educational experience in the department.

Student Highlight

Camille Martin (BS 2014) was highly involved with research throughout her time at Andrews. Dr. Murray was the professor who first told her she was "not too young for research" as a Freshman Chemistry major. This inspired her to become involved with research in the department, and apply for summer research experiences of which she obtained one at Virginia Commonwealth University and the other at Western Michigan University. Her research experiences led to an internship at MeadWestvaco in their specialty chemicals division. In that division, she worked in asphalt innovations on synthesizing an additive for asphalt to improve performance properties. This fall she will begin a PhD program in organic chemistry at Northeastern University in Boston. Of her time at Andrews, Camille notes, "The coursework was definitely competitive with other schools. The faculty were available for extra help and were extremely supportive." Camille advises future STEM students by saying, "Get involved with research as soon as possible. Join some of the professional organizations on campus and attend the conventions because this is a great opportunity to network."

Department of Chemistry & Biochemistry

"When you have seen one ant, one bird, one tree, you have not seen them all." ~Edward O. Wilson

Everglades Trip

Every other year, students have the opportunity to take a class in the Florida Everglades. This course provides hands on study of the diverse ecosystems in south Florida. This year, fifteen AU biologists (2 faculty and 13 students) spent their spring break exploring a variety of unique habitats in the Everglades.

Of her time on the trip, Ashley Reichert comments, "The Everglades biology trip was an exciting learning experience that will surely be one of the highlights of my years at Andrews University. The days spent trekking through marshes, canoeing through mazes of mangrove tree islands, and snorkeling at the beautiful Looe Key reef taught me so many things about the world I live in that I had not yet been exposed to. In addition to gaining a fuller knowledge of Florida ecology, I was able to share the experience with students and professors who love nature and biology just as much as I do. I can't think of a better way to have spent my Spring Break!"

Research

A new tradition began this year as both Dr. Litvack's & Dr. Lyons' students from their classes, Systems Physiology and Genomics, Proteomics, & Bioinformatics, presented their coursework in a poster session in the biology lobby. These sessions gave the students the opportunity to prepare a poster, share what they learned through the course, and improve their presentation skills.

This year, the Department of Biology was the only department on campus in which every full-time faculty (11) submitted a faculty research grant application (new, extension, or renewal)–with every proposal funded! In addition, two of our faculty (Jim Hayward with Shandelle Henson, and Peter Lyons) submitted major NSF proposals (~$500,000 each), and another (Kanya Long) is co-investigator on a proposal that has been funded (~$125,000).

Funded FRG proposals included collaborations with faculty in math, health and wellness, chemistry, and physics, as well as numerous external collaborations (e.g., UC Davis, Johns Hopkins, etc.).

We are very pleased to see this shared commitment to scholarship, especially as we mentor students and look forward to the output–most importantly, the many research opportunities that will enrich and deepen the educational experience of our students who participate from beginning to end–including publication.

To more fully explain the many research opportunities and their importance in the Department of Biology, a research video was shot throughout the fall and spring semesters. This video is available on the departmental web site.

In honor of 26 years of service and his passion for biology, a hallway was dedicated to Dr. Steen. The hallway is meant to display the senior biology student's research posters in beautiful wooden frames, which were handcrafted by Dr. Steen. The caption on the plaque reads, "This hallway celebrates the diverse research of Honors and other undergraduate research scholars from the Department of Biology."

Student Highlight

Zach Reichert, current biology student, is already adding successful experiences to his resume after completing his sophomore year. He has been involved with research in the Department of Chemistry with Dr. Hayes, participated in the research with the Seabird Ecology team, and went on the Florida Everglades class trip over spring break. This summer he spent a week on Protection Island with the Seabird Ecology team then headed to a summer undergraduate research fellowship at the Mayo Clinic. At Mayo he will study the cellular events and molecular mechanisms underlying neural regeneration in the Developmental and Regenerative Neurobiology laboratory led by Dr. John R. Henley. Zach notes, "The meaningful interactions and experiences with the professors in the Biology and Chemistry Departments have fueled my interest in and passion for science and provided me with valuable opportunities."

Department of Biology

"The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth." ~ Niels Bohr

In early August, a small group of faculty, staff, and students joined together for a departmental backpacking trip to Charles Dean Wilderness Area. Kelly Youngberg, our new Administrative Assistant, organized the trip and demonstrated the caliber of ideas and vigor that she continues to bring to the department.

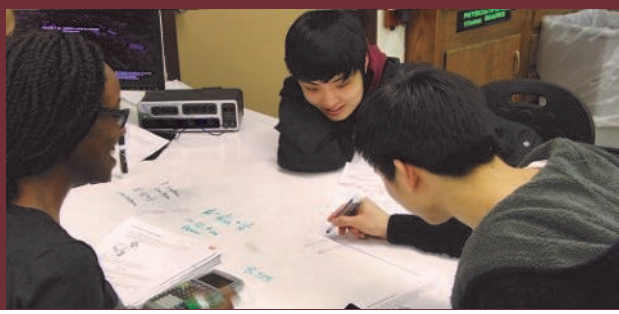
We now have Optical Tweezers available to students for conducting nano-technology research and expanding laboratory skills across the STEM disciplines. This equipment was designed and purchased in partnership with the Department of Engineering and Computer Science, which will house it under the direction of Hyun Kwon. We also completed the building of a museum-quality tesla coil, which is currently in the tuning and testing phase. The levitation experiment, pictured right, continues to be well received and draws excitement. Brendon Cross demonstrated it in the fall for the Capital Expenditures committee who helped to purchase it.

The latest addition to our high-tech equipment is a vibration isolation table (4' x 8') to support optical systems including holography and atomic force microscopy (AFM). It will soon facilitate identification of folding patterns of proteins, a collaborative research project in biology (Peter Lyons), physics (Brendon Cross), and chemistry (David Randall), thus opening new avenues of research in STEM. Currently, students and faculty have found that this table provides much improved stability due to its extreme mass of 1500 pounds (which posed an interesting problem for delivery and instillation to HYH 229), pneumatic leveling in the legs, and athermalized design.

Brendon Cross built a 4'x6' box for ooblech, a non-Neutonian mixture of cornstarch and water, and gave students the opportunity to "run and jump on water" during SciFEST. As shown in the photo on the left, the Dean of CAS and the STEM coordinator enjoyed it as well.

We inducted Dewey Murdick (BS Physics 1999) into Sigma Xi this spring. He was our visiting speaker and gave the lecture for the induction supper, "Hypotheses, Experiments, and Evaluation." He shared a bit about his position managing high risk, high payout projects for a US intelligence agency. One of his projects, Foresight and Understanding Scientific Exposition (FUSE), "analyzes language in patents and papers to identify next big technologies" (Nature, http://www.nature.com/news/text-mining-offers-clues-to-success-1.15263). This project was recently highlighted in *Nature*, an international weekly journal of science of high repute.

SummerPhysics is an exciting time, as always, and this year we are continuing and expanding the Small Group Learning with "table toys" to enhance the learning experience. A new addition was a Learning Assistant supper seminar as part of the class Topics in: Physics Learning and Pedagogy Seminar. This group worked to improve the small group learning experience for the SummerPhysics students. Grace Carlos provided brain food for students each morning, fueling as well as intensifying the camaraderie that is a key element in the SummerPhysics experience.



Student Highlight

Jonathan Wheeler recently returned from Beirut, Lebanon, where since September 2013 he was a student missionary. There he taught 7th & 8th grade math, assisted with Bible classes and organized chapels, did IT (as well as helps with IT at the University), and supervised some of the science labs. For extracurricular activities, he taught piano and guitar lessons to the students and sponsored the robotics club. He was also involved with music and youth groups at the local church. About choosing to be an SM, Jonathan says, "Other students and the [physics] department generate a positive peer pressure, which is one reason why I went as an SM. Andrews provides a close and personal relationship between mentors and students that is invaluable for future interpersonal development in a career."

"High achievement always takes place in the framework of high expectation."
~Charles F. Kettering

During Engineering Week, over 200 elementary school students visited our department. They went through rotating stations to learn different concepts about robotics, catapults, electricity, and more. This experience gave our current students an opportunity to share some of their knowledge and excitement about engineering with the next generation.

The student clubs were active this year, with the coding club gaining popularity as they tackled new and exciting projects. Some projects from 2013-2014 included Arduino programming, Unity 3D, robot/drone programming, and app creation. Students also have an active FB group where the members share ideas, articles, and other relevant computer science information. This year the department purchased devices for the students to use, including, iPads, iPhones, Android phones and tablets, and windows based systems. These platforms give students the opportunity to learn additional programming languages and expand their abilities in the different systems. Plans for the 2014-2015 school year include working on more quality projects that will lead to potential internships/jobs, attending professional conferences, and inviting experts for presentations (Alumni and local CS professionals).

As of this spring, we have an official Andrews University Engineers Without Borders chapter. This chapter became something the department wanted because of our mission of service and the many outreach activities in which our students are already involved. "Joining Engineers Without Borders will help us to continue fulfilling our mission of service and meeting people's needs," says Dr. Ng. "It will give us the framework to use our engineering skills in design, collaboration, and service to further Christ's mission."

Seniors completed eight senior design and capstone projects this spring, all diverse and well-thought out. Some of the projects included a wind tunnel, near infrared imager, automated grain moisture control system, Gazebo online ordering system, and an automated rod cutter. Some of the projects received support and/or additional funding outside of the department, giving students the experience of working with clients and real-world problems.

Student Highlight

Tommy Zirkle (BSE 2014) had two Summer Undergraduate Research Fellowships at the National Institute of Standards and Technology (NIST) between his studies in the AU Engineering program. This summer he is going to Argonne National Laboratory near Chicago to work with nano materials and electrical characteristics of thin films. After his research at Argonne, Notre Dame has accepted Tommy into their engineering PhD program. Explaining the importance of internships, Tommy says to future students, "Internships allow you to apply what you've learned at Andrews; internships also have a big impact on your resume. But the most important thing is the confidence you gain as an engineer."

Mathematics >>>

"Pure mathematics is, in its way, the poetry of logical ideas." ~ Albert Einstein

Pi Mu Epsilon, the national mathematics honor society, promotes excellence in mathematics. At this year's induction, Dr. Moore spoke on "Maxima and Minima without Calculus." During the ceremony, 10 students and 1 professor were inducted into the chapter. Danielle Martin was chosen as President and Ada Alvarez as Vice President for the 2014/15 school year.

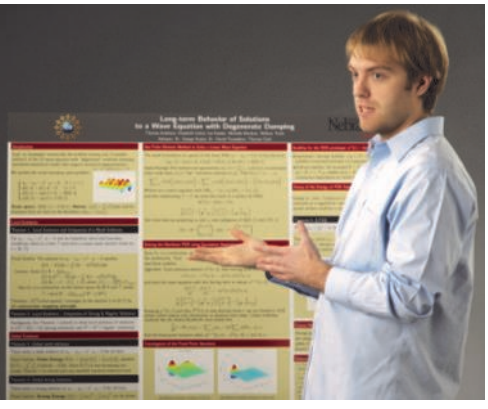
(photo: Math commons was updated over Christmas break)

This spring, the Seabird Ecology Team was granted a 5-year renewal of their funding by the National Science Foundation (NSF). The project, led by Math Chair Shandelle Henson and Biology professor Jim Hayward of Andrews University, is collaborative with Jim Cushing at the University of Arizona. It focuses on the effects of climate change in marine organisms with respect to foraging and the timing of reproduction**.** Students will continue to gain experience in mathematical ecology as they prepare for careers in STEM fields.

Danielle Burton (BA English, French, Mathematical Studies 2008, MS Mathematics and Science 2013) has realized success in the early stages of her mathematics PhD program at the University of Tennessee, Knoxville. Her paper, "A note on the onset of synchrony in avian ovulation cycles," was accepted and published in the Taylor & Francis research journal *The Journal of Difference Equations and Applications*. It was also chosen as the Mathematics Article of the Week from all Taylor & Francis journals. Furthermore, she received the Graduate Student Achievement and Scholarship Award for 2014 for outstanding academic achievement at the University of Tennessee. Danielle speaks highly of her Andrews mentors in preparing her for her current program, saying, "Your support and mentorship is one of the things that makes Andrews exceptional."

On another successful note, Dr. Oh and Dr. Weldon were both granted tenure this spring. In addition to tenure, Dr. Weldon earned the title of Associate Professor. The current faculty and emeriti held a dinner in their honor to celebrate this milestone.

Student Highlight



William Tritch is a 2014 graduate from Andrews University with BS degrees in Mathematics and Physics. While at Andrews, he participated in many research projects, including some interdisciplinary projects. In 2013, William enjoyed a summer research experience for undergraduates (REU) at the University of Nebraska-Lincoln where he studied partial differential equations. In the fall, he is headed to a PhD program at Texas Tech University to work on a PhD in Mathematics. He has a full fellowship and plans to work with the well-known mathematician Linda Allen in the field of mathematical epidemiology. Of his time at Andrews, William notes, "Arriving at Andrews, I planned to pursue medicine; however, the faculty helped me see that this was not the right fit. Through their support and encouragement, they helped me discover a field that combines my love for mathematics and medicine—mathematical epidemiology."

Department of Mathematics

2014 STEM Awards & Internships >>>

Internships:
Michael Hernandez—Adventist Health System Internship
Lucas Kontes—Tyco Retail Solutions Internship
Luis Rios—Cisco Systems Internship
Christopher Sutton—Electrical Engineering Internship at Diveleiss

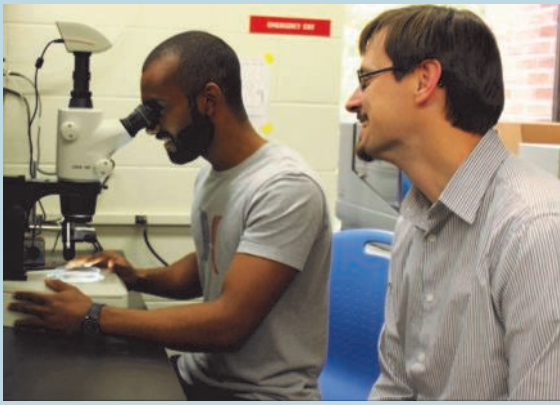
Research:
Belinda Cheeseboro—Kitt Peak National Observatory (REU)
Craig Dujon—Research with Henson
Hazel Ezeribe—Zebra fish research with Lyons
Re'Jeanne Greene—Research with Navia
Yudy Guzman—Research with M. Murray
Andrew Hong—Research with Nowack
Luke Kang—Collecting data at Johns Hopkins for Honors Research Project
Viktoria Kolpocoff—Research with Long
Joanne Lee—Research with M. Murray
Adrianne Magsipoc—Research with D. Murray
Wade Saint Martin—Seabird Ecology Team with Hayward & Henson
Michael Plantak—Research with Hayes
Robert Polski—Center for Research on Interface Structures & Phenomena at Yale (REU)
Ashley Reichert—Seabird Ecology Team with Hayward & Henson
Zach Reichert—SeaBird Ecology Team, Mayo Clinic Research Fellowship with Dr. John Henley
Isabel Stafford—Applied Mathematics at North Carolina State University (REU)
Rosanne Thornhill—Research with Ahlberg
Wayanne Watson—Seabird Ecology Team with Hayward & Henson
Sumiko Weir—Seabird Ecology Team with Hayward & Henson
Eric You—Research with Hayes
Thomas Zirkle—Summer Fellowship at Argonne National Laboratory

DeHaan Work Excellence Award:
Samantha Snelling
Timothy Iuliano
Brandon Baptist

Physics Excellence Awards:
Lukasz Krzywon
Dillon Zimmerman

Earhart Emerging Scholar Award: Matthew Chacko

Who's Who in American Colleges & Universities:
John Ahn
Kylynda Bauer
Brian Booth
Matthew Chacko
Philip Giddings
Ricardo Huancaya
Jamie Kim
Andrew Kutzner
Nina Lassonnier
Christine Lee
Larry Mendizabal
Andre Moncrieff
Robert Polski
Andrew Roderick
Jason Ruiz
Philippe Stanier
David Thomas
Erik Thordarson
Ross Trecartin
William Tritch
Stefan Von Henner
Jonathan Wheeler
Thomas Zirkle



CONGRATULATIONS Spring 2014 STEM Graduates!

Acre, Lysandra—BS Mathematics, Biology, PME, PKP
*Ahn, Jonathon—BS Biology, TB, PKP
Booth, Brian—BSE Engineering
Breja, Andrei—BS Computing
Browne, Charles—BSE Engineering
Buchholz, Adam—BS Computing
Burke, Kristina—BS Biology
*Chacko, Matthew—BS Biology, TB, PKP
Chavez, Stephanie—BS Biology
Dass, Stuti—BS Biology
Emanuel, Jamie—BS Biology
*Giddings, Philip—BS Biology
Gilbert, Stephen—BS Biochemistry
Jacques, Leslie—BS Biology, TB
Jewett, Robert—BSE Engineering
Johnson, Davina—BS Biology

Kerbs, Julia—BS Biology, PKP
*Kim, Jamie—BS Biology, PKP
Krzywon, Lucyna—BS Biology
Kutzner, Andrew—BS Biology, PME, PKP
Lassonnier, Nina—BSE Engineering, PME, PKP
*Lee, Christine—BS Biology
Lee, Jonathan—BS Biochemistry
Lee, Joseph—BS Mathematics, PME
Lescay, Hernan—BS Biology
Logan, David—BS Computing
Malone, Austin—BSE Engineering
Martin, Camille—BS Chemistry
Mauch, Madelyn—BS Biology
McDonald, Robert—BS Biology
Mejeur, Andrew—BSE Engineering
Mendizabal, Larry—BSE Engineering, PKP
Penny, David—BSE Engineering
Pryce, Cherie—BS Biology, Psychology
Roderick, Andrew—BSE Engineering, PME, PKP
Ruiz, Jason—BSE Engineering, PME
Sittlinger, Cady—BS Biology, PKP
*Snelling, Samantha—BS Mathematics, Physics, PME, SPS, PKP
Stanier, Philippe—BS Biology
Stout, Elisabeth—BS Biology, TB, PKP
*Thomas, David—BS Biology, TB, PKP
*Thordarson, Erik—BS Biology

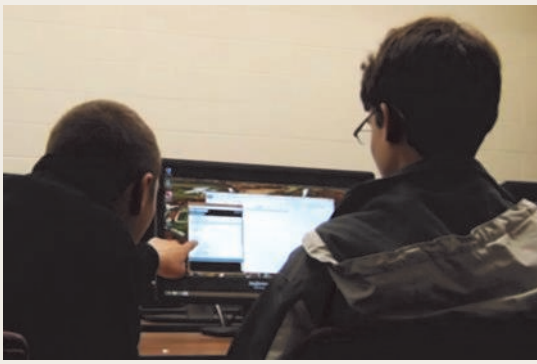
*Trecartin, Ross—BS Biology, TB
Tritch, William—BS Physics, Mathematics, PME, SPS, SX, PKP
Von Henner, Stefan—BSE Engineering, PME
Williams, Tanner—BSE Engineering, PME
Woo, Hwuk—BS Biochemistry
Zirkle, Thomas—BSE Engineering, PME, SPS, SX , PKP

STEM Honor Societies:
Pi Mu Epsilon—PME
Sigma Xi—SX
Sigma Pi Sigma—SPS
TriBeta (Beta, Beta, Beta)—TB

*Indicates J.N. Andrews Honors Scholar
Phi Kappa Phi—PKP

2013 SciFEST Photos >>>




Contact >>>

STEM Enrollment Coordinator

Rachel Boothby

Division of Science, Technology,

Engineering, & Mathematics

College of Arts & Sciences

Andrews University

***Office**: 269-471-3872*

***Email**: stemconnect@andrews.edu*

SciFEST 2015:

The STEM Division looks forward to hosting the second annual SciFEST on February 19-22, 2015. The theme will be “Elements” - Fire, Water, Earth, Air. We’ll be exploring what is elemental to the science/engineering disciplines as well as to our faith.

We invite North American Division academies, area public schools, and homeschoolers to participate. Each school is encouraged to send a team of 5 students and 2 science/math teachers.

ANDREWS UNIVERSITY STEM
Science | Technology | Engineering | Math