

MOLECULAR SIEVE

Annual newsletter for alumni and friends of the Andrews University Department of Chemistry and Biochemistry

An American Chemical Society Approved Program since 1976

Fall 2014

Lab & Amphitheater Renovations Completed

In This Issue:

- 1 Renovations
- 2 Instrumentation
- 3 ChemClub
BCCE
- 4 Graduates
Seminar
- 5 Recruiting
Summer Organic
- 6 Alumni News
- 7 Alumni News
Computational Chem
- 8 From the Chair
Forensic Lab

Faculty:

Lisa Ahlberg, PhD
Ryan Hayes, PhD
Getahun Merga, PhD
Desmond Murray, PhD
David Nowack, PhD
David Randall, PhD

Staff:

Roshelle Hall, BS
Dana Johnston, MS
John Rorabeck, MS

During the summer months, since 2009, the department has endured significant disruption for the sake of progress. We are happy to finally have the HVAC project—which furnishes our hoods, labs and offices with quality air—completed.

With the installation of the new energy recapture unit (shown below), the system will be able to safely remove heat from the exhausted air and recover it to help maintain a comfortable learning environment. Similarly, in the summer the unit will be able to regulate the exhaust of air from the hoods while preserving the chill for the air-conditioned interior of the complex. (No fumes exchanged!) The payback period for this investment will be short.

Students returning to school in the fall were happy to find that a new water fountain (pictured on the right) had been installed, outfitted with a convenient and environmentally friendly bottle-filling station. Already we have prevented the equivalent of thousands of water bottles from entering the waste stream.



Large-scale Rotovap

Thanks to a loan from the PVT fund, which is generated from sales made by Physics Enterprises, our Andrews ChemServices business is now in possession of a large scale **Buchi R-153 rotovap**. This has allowed us to synthesize large batches of our proprietary dendrimers (spherical polymers) for researchers around the world. It is especially nice that there are two collection flasks so that one can be drained while the other is still receiving distillate. This also minimizes the reaction's exposure to air, which is a big plus for the purity of the final product.

What is **Andrews ChemServices**, you ask? Well, for several years our department worked in cooperation with Dendritic Nanotechnologies (DNT), a Michigan company developing dendrimers. We provided storage, shipping and handling for some of their polyamidoamine (PAMAM) dendrimers as well as synthesis of the same when stocks became low. Last year, we acquired the non-exclusive rights to manufacture and sell Starburst PAMAM dendrimers from DNT for academic research.

We are providing research dendrimers to clients from Japan, Switzerland, Mexico, Canada and more. This business has been an opportunity for student jobs, a rich source of research material for ourselves and undergraduates, as well as a much-appreciated cash infusion.



Preparatory HPLC



The Agilent 1260 HPLC purchased in the summer of 2011 has been one of the instrumental workhorses of the department, used for identifying chemical components in student instruction and research alike. In fact, we have recently increased the usefulness of the HPLC with added SEC columns and a fluorescence detector. However, we needed to be able to do more than identify a substance; we needed to be able to actually purify and collect some of the constituents of a solution—and for that we needed a good preparatory HPLC.

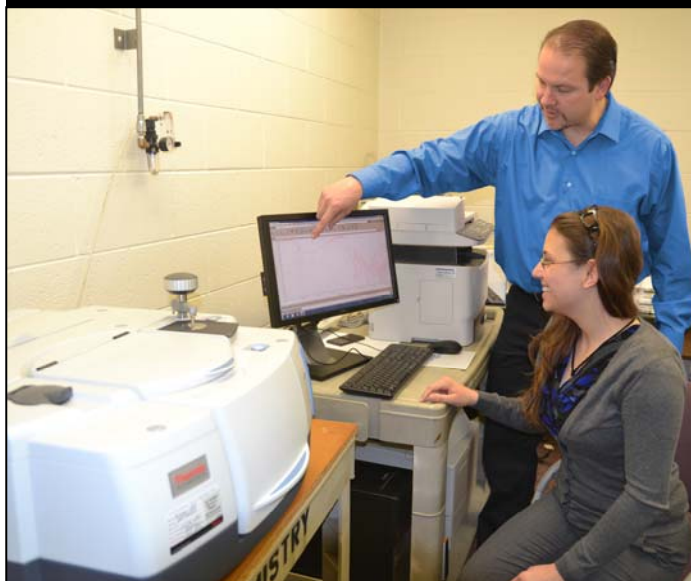
A preparative HPLC is very similar to an analytical HPLC, but instead of the injection of a small amount of product to maximize the resolution, the amount of feed is very high in order to maximize the purification productivity and minimize the amount of solvent used. With that in mind, we are happy to announce the arrival of our new **Waters 4000 Preparatory HPLC**.

The **Molecular Sieve** is produced annually
by the Andrews University
Department of Chemistry and Biochemistry,

and is distributed to alumni and friends.

Editor—D. Johnston
Editor-in-Chief—D. Nowack

New FT-IR Spectrometer



After nearly 20 years of service, our Magna II FT-IR became completely inoperable last winter. The Magna II ran on software which had become very outdated—and required that we use a very old computer. As a result we were not able to readily transfer files electronically.

Through a special arrangement with the vendor—and through the generosity of the university and our alumni donors, we are now blessed to add to our instrument suite the **Thermo iS50 FT-IR** pictured above.

This new research grade IR is equipped with ATR, “attenuated total reflectance,” as well as the standard salt plate port. The ATR dramatically improves throughput on the instrument by minimizing sample prep. It also makes it feasible to run IR spectra on solid samples, which are simply slipped under the ATR probe. Imagine the impact for our organic chemistry labs, where long lines used to form as students waited for their turn with the FT-IR.

ChemClub Officers



From Left to Right: Monica Hamilton, Secretary; Jiyeon Lee, President; Samantha Chang, Secretary; Kaydra Bailey, Pastor; Betsy Quetz, Public Relations; Jordan Holzschuher, Treasurer

Quant Lab Coats



Back: Dr. Scott, Dr. Merga, Tonkin Kim, Dr. Hayes, Ali Edge, Joanna Moses, Adrienne Magsipoc, Irene Hwang, Dr. Murray
Front: Jasmine Grigg, Naude Pierre, Monica Hamilton, Dr. Randall, Iris Peter, Seth Campbell, Dr. Nowack, Dr. Wong

We continue the tradition of awarding lab coats to our majors who take on the challenge of **Quantitative Analysis**. Each coat is embroidered with the name of the courageous student unafraid to tackle some serious chemistry.

This year we shared this momentous occasion with our guest seminar speaker, Dr. Colleen Scott of Southern Illinois University, and with our own Professor Emeritus Peter Wong.

BCCE 2014

This summer at the **Biennial Conference on Chemical Education** (BCCE) held at Grand Valley State University, Dr. Murray organized and chaired a symposium on *Early Matters: Engaging High School and Community College Students in Research*. Speakers from Western Michigan University, Thermo Fisher Scientific, Columbia College Chicago and others highlighted the hands-on involvement of their students in authentic research much earlier than is conventionally done.

Part of the impetus in advocating for universal adoption of early research are the many credible and authoritative reports over the last 30 years showing that (a) American K-16 science education is underperforming vs. the pre-eminence of American graduate-level science education, and (b) according to the National Research Council 2005 report, “the quality of science laboratory experiences is poor for most U.S. high school students.”

Based on the success of this experience, Dr. Murray intends to chair a repeat performance at the 2016 BCCE at the University of Northern Colorado.

See the photo of Andrews Alumni attending the 2014 BCCE below Loren Barnhurst’s note on page 6 in the Alumni News section.

Toast to Seminar's 50th

Raise your beakers—that's right, our chemistry seminar program is reaching an important milestone. The 2015-2016 school year marks **fifty years** for us, and we'd like you to help us celebrate.

Alumni, retired faculty and staff—we are looking for your ideas, suggestions and resources. This is your party all year long. If you gave a seminar as a student or as a guest speaker anytime over the last fifty years, or even if you just sat, listened and enjoyed—we want you! Whether you can be here in person or not, you can participate.

We'd like you to write short, fun, inspiring notes about your memories of seminar. Tell us the when, what, who, how and why of it all. Use video or just plain text. We will then post them online at a dedicated website during our 50th anniversary year-long celebration.

Planning begins now, so please contact us today. Send your suggestions and stories to Dr. Desmond Murray at murrayd@andrews.edu.

The Seminar Tradition

"Wow. Your students ask great questions," the guest speaker said. This continues to be, year in and year out, the most common response speakers have following their presentations. Our students' questions are reliably thoughtful, insightful, impressive.

This fall we have had some timely topics at the cutting edge of science and research. These include: climate change in the Arctic; paper-based diagnosis to analyze suspect pharmaceuticals; the search for a cure for the Ebola virus; integrity in scientific publishing; creating drug candidates for breast cancer using bioinformatics, gunshot residue analysis on decaying bodies; and developing organic-based nuclear waste remediators.

The Ebola lecture made the front page of the local *Herald Palladium* newspaper. Dr. Nowack was pictured with the speaker, Dr. Robert Stahelin of Indiana University School of Medicine. New York School of Medicine's Dr. Oransky, co-founder of Retraction Watch, was available via a special webinar which was sponsored by our department, the College of Arts and Sciences, the Office of Research and Creative Scholarship, the *Benton Spirit Community Newspaper* and BEST Early.

For the **entire list of 2014-2015 speakers**, their bios and topics, email murrayd@andrews.edu.



2014 Graduates & Awards

2014 Undergraduate Degrees Awarded

Stephen Gilbert, BS Biochemistry, Cum Laude
Jonathan Lee, BS Biochemistry
Camille Martin, BS Chemistry
Hwuk Chan Woo, BS Biochemistry

2014 Class Awards

ACS General Chemistry Award	Won Jin Jeon
ACS General Chemistry Award	Austin Huh
ACS General Chemistry Award	Joshua Ahn
ACS Organic Chemistry Award	Ashley Reichert
ACS Organic Chemistry Award	Trevor Zimmerman
ACS Organic Chemistry Award	Zach Reichert
ACS Analytical Chemistry Award	Andrew Hong

2014 Scholarships

Lois K. Mutch Scholarship	Alanna James
Tait Family Scholarship	Satoshi Thiele
Dwain Ford Scholarship	Ji Yeon Lee
Halenz Scholarship	Andrew Hong
Richard Cook Scholarship	Seth Stacey
Richard Minesinger Scholarship	Rosanne Thornhill
Mutch, Scorpio, Wilkins Award	Seth Campbell
Robert Wilkins Scholarship	Samantha Chang
Bruce Lee Scholarship	shared by*
*Alexandria Edge, Emily-Jean Bankes, Adriana Delgado, James Butlin, Kaydra Bailey	
Hall-Miller Scholarship	shared by**
**Hyelin You, Irene Hwang, Gielle Kuhn	

Become a Chemistry Partner:

Would you like to give to support the program you loved as an undergraduate?

Send checks to:

Department of Chemistry and Biochemistry
4270 Administrative Drive, HH225
Andrews University
Berrien Springs, MI 49104

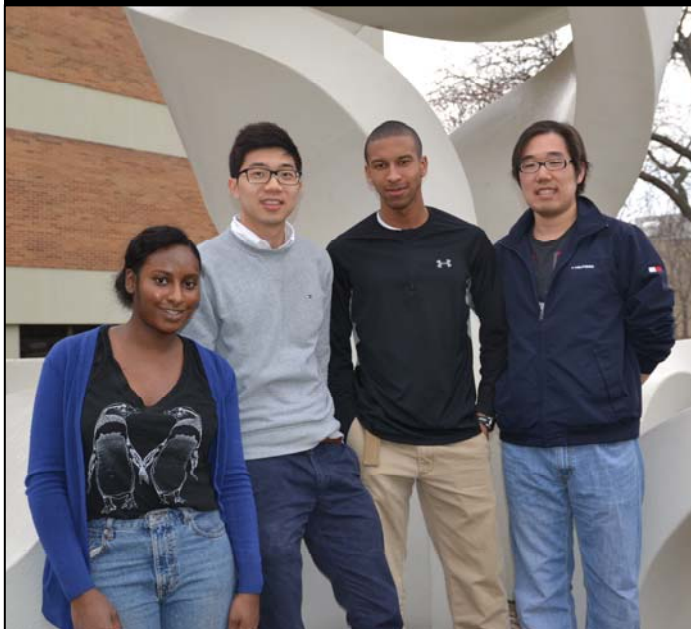
Recruiting Trip

In February 2014, David Nowack traveled to the East Coast with David Steen (professor of biology), David Sherwin (photographer) and Randy Graves (enrollment manager) to meet prospective students at the academies of the Columbia Union Conference. In a single week, they traveled to Highland View Academy (HVA), Shenandoah Valley Academy (SVA), Pine Forge Academy (PFA), Blue Mountain Academy (BMA), Spencerville Adventist Academy (SAA) and Tacoma Academy (TA).

Dr. Nowack provided **chemistry demonstrations** and met many outstanding students and chemistry teachers. When asked about the impact of the connections he made, Dave said, "This trip and the classroom visitations enabled me to advocate effectively for Andrews University and for chemistry as a profession. It is always fun and humbling to meet the chemistry instructors in our academies. They work under significant time constraints and budget limitations yet do an exceptionally good job."



2014 Graduates



Left to Right: Camille Martin, Hwuk Chan Woo (Ryan) Stephen Gilbert, Jonathan Lee



Alumni News

Chantelle Morris (BS, Biochem. '05)

After graduation I moved to Korea where I taught English and Science for seven years. I'm back in the Western Hemisphere and currently working on my post-grad certification in Clinical Research in Toronto.

Loren Barnhurst (BS, Chem. '96)

From Andrews, I headed to Colorado, where I received my PhD in Synthetic Organic Chemistry from the University of Denver. My wife of 18 years, Rebecca (Finley) Barnhurst (also a graduate of Andrews—BS Dietetics, 1996), and I now live in Ooltewah, TN. We have a five-year old daughter, Clarissa Jade. I am a professor of chemistry at Southern Adventist University, where I've been teaching organic for thirteen years.

This summer I attended the Biennial Conference on Chemical Education (BCCE), which was held in Grand Rapids, Michigan. I was pleased to note that there was a large group of Adventist university-level educators who had also graduated from Andrews University. Here is a picture showing the Andrews alums at BCCE.



From Left to Right: Kent Davis, PUC; Robbie Wilson, PUC; Kyle Craig, Walla Walla; Krista Montschiedler, La Sierra; David Randall, Andrews; Lisa Ahlberg, Andrews; Ryan Hayes, Andrews; Loren Barnhart, Southern; Brent Hamstra, Southern
Not pictured: Desmond Murray, Andrews; Bruce Shilling, Southern

Sheridan Smith (BS, Biochem. '93)

I chose to pursue a career in education after my biochemistry training at Andrews. In 2006 I was awarded an Educational License. I plan on starting a master's program in educational administration soon. My wife and I live in Gary, IN, with our two sons and our daughter. I work for the Gary Community School Corporation teaching chemistry and physics at the New Tech Innovative Institute.

Kenworth Holness (BS, Biochem. '87)

Dear Dr. Nowack: So glad to see that you continue this annual newsletter. I haven't been back to Andrews

University or the to Andrews Academy in a few years. Your efforts in the department are appreciated. I still remember when Dr. Mutch, Dr. Wong, Dr. Ford, Dr. Wilkins and Dr. Scorpio were there. I also have fond memories of you and your wife at the academy.

Following my graduation from Andrews, I went to Loyola Stritch School of Medicine in Maywood, IL, and graduated with an MD in 1993. I'm now living in Macon, GA, working as a primary care physician at Carl Vinson VA Medical Center and at Perry VA Outreach Clinic.

Please give my love to your wife and family, to Dr. Desmond Murray and the others. Carry on the Chemistry baton with pride and God bless you.

Janet Thomas (BS, Chem. '86)

Just a quick update from Chicago. I got your postcard a little late—hope this reaches you in time. I own the 3rd Coast Café (3rdcoastcafe.com) in downtown Chicago. In my spare time I work with Shark Stewards assisting in the shark and turtle tagging efforts to track them and do our best to save them. The oceans are a mess with the plastic and over fishing. We are trying to make a difference.

Please come for a visit next time you are in Chicago!

Judith Baity (BS, Chem. '81)

I didn't get your postcard until after the deadline for replies—but wanted to send this update anyway. After graduating from Andrews, I completed a Master of Chemistry degree from the University of North Carolina



Back: Malcolm (son), Greg (husband), Gregory II (son)
Front: Cecelia Fairclough (mother), Judith (me)

at Greensboro. I currently live in North Carolina with my husband. We have two adult children.

I work for Jowat Corporation—a division of Jowat AG, which is headquartered in Detmold, Germany. We make adhesives for the woodworking, packaging and automotive industries. I am the vice president over quality and management. My job has taken me to Germany,

Alumni News

Malaysia and South Korea. I'm hoping to make it to Australia and China soon!

For fun, I am learning German, card-making and scrapbooking, and I teach a chemistry course at the local community college when my schedule permits. Nothing could be finer than to be in Carolina!

I've attached a photo of my family. (on previous page)

Jan Michaelis (BA, Chem. '77)

On November 3, I received your postcard asking for updates to be emailed no later than November 1st. I don't know if any amount of chemicals can make that happen!

Some of my memories from my time at Andrews include William Mutch, referring to his wife as the "rate limiting factor" on a hike he had recently taken. Then there was David Moll with his HP reverse notation "pocket" calculator in class. Oh, and I can't forget the acetone fumes in chemistry lab. I also remember fighting sleep in the back row of the amphitheater during organic class following a hearty lunch in the cafeteria.

I received a Doctor of Public Health degree and a Master of Health Education and a Master of Nutrition in 1981 from Loma Linda University. I still live in Loma Linda, CA, and I work at the school of nursing there. I am their "computer guy." For recreation and exercise I like to ride my road bicycle.

My wife, Retta (Fisher) Michaelis (also a graduate of Andrews—BS Med Tech) also works at Loma Linda in the Medical Center Clinical Laboratory. Our two daughters, both attended Walla Walla University. Janene is married and lives in Walla Walla. Janelle is studying computer science at the University of Utah.

Douglas Pond (BA, Chem. '65)

Meier Hall was brand new the year I graduated. My sister and I had left home in Nelson, BC, in the fall of 1964. We traveled in my 1937 Plymouth to Fort McCloud, Alberta, where she continued north to Canadian Union College while I hitch-hiked on to Andrews. We left home on a Thursday and I arrived at Andrews the following Monday, having spent Sabbath with the pastor's family in Duluth, MN. Sunday night I slept beside the freeway about 30 miles from Andrews. In the morning, I caught a ride with a fellow who was heading to California. I guess that is Murphy's Law in action. So that is how it began—a good year, full of great memories.

In 1980, I received a Master of Education from the University of Victoria. In 2013 I retired and am now living in Nelson—in the very house I left that fall in 1964 on my way to Andrews University. Before settling down in Nelson, I was a volunteer pastor in Morocco for one year. My wife, Marilyn (née Goertzen), and I have been married for 49 years.

George E Kieler (BA, Chem. '54)

I was awarded an MD from Loma Linda in 1959, and currently live in Roscommon, Michigan. The years I spent at Andrews were the best of my life.

Computational Chemistry

In the summer of 2014, David Randall attended a computational chemistry workshop funded by the National Science Foundation and organized by Prof. T. Shepard at Westminster College in Salt Lake City, Utah. The NSF provided funding for the conference and for housing as well.

Acceptance to the program was by competitive application and the goal of the workshop was to provide sufficient background information on this rapidly developing area of chemistry to empower attendees to be able to present material to undergraduates at their home institutions.

Presenters included leading researchers Prof. R. Hernandez (molecular dynamics) and Prof. D. Sherman (quantum chemistry), both of Georgia Tech. Professor T. Shepard led the afternoon sessions that contextualized the theoretical morning sessions.

In addition to firming up his understanding of these topics, Dr. Randall reports that one unexpectedly valuable aspect of the conference was the opportunity to network with chemistry teachers from small colleges from around the country.



Dr. Randall, shown here at Westminster College, was awarded the Daniel A. Augsburg Excellence in Teaching Award this March.



Message from the Chair

Greetings Chemists and Biochemists! You hold in your hand another outstanding *Molecular Sieve* for the fall of 2014. Dana has put together an attractive collection of stories and pictures that provide a snapshot of the many good things going on in your department. As always, the department exists to serve our students with excellence and with a distinctly Seventh-day Adventist Christian world view. The faculty and staff feel truly privileged to be a part of that service to God.

The last *Molecular Sieve* declared that the renovation of Halez Hall was done, but life is sort of like a bad movie title, *Never Say Never Again*. The summer of 2014 was spent dealing with an additional renovation in the building to accommodate the reorganization of the lab spaces for **Medical Laboratory Sciences (MLS)**, our Halez Hall neighbors. Both departments gained square footage because the cadaver lab was moved out, but frankly, our department lost some usability because some of the added space for chemistry is located in a room separated from Halez Hall. We are adapting to the new reality and are happy for MLS with their fine new facilities and the additional enrollment that allows.

Our **instrument suite** has increased again due to the generosity of alumni, the university and others. The instruments, one of which is new and the other new-to-us, are described in short articles and pictures in the *Sieve*. Our suite of instruments continues to be enhanced with additional functionality and usability. Our students will have hands-on experiences that will allow them to have a distinct advantage in today's competitive job market.

We are pleased to announce a new joint program between the Departments of Chemistry & Biochemistry and of Biology. The **BS in Biotechnology** is designed for students seeking employment in the sciences immediately following their college graduation. Its emphasis will be hands-on, bench-top biology and chemistry training incorporated with a strong component of work experience through internships and co-ops.

~ D. David Nowack, Chair

Forensic Lab Report

Local Impact of Legalization Elsewhere

As director of the Forensic Drug Identification Lab for Berrien County, I am one of the first to see changes in **local drug abuse patterns**. Of particular interest is how the current relaxation of marijuana laws in Colorado and Washington states might be affecting Southwest Michigan.



The incidence of marijuana submissions jumped 14% in 2013 over the 45% of all submissions to the lab that has remained fairly consistent over the past decade. There has been at least one large seizure in Berrien County that was a direct result of Western suppliers moving their processed plant material to more lucrative markets via highway I-94.

Of more concern is that the more lenient laws send a message to young people that there is less danger in trying marijuana. Local schools are seeing increased use even as medical research is revealing more dangers associated with marijuana use, particularly in adolescent brains.

Another observed trend is more and varied seizures of edible forms of marijuana. I am seeing chocolates, hard candies, "gummies" and even beef jerky laced with THC. Fortunately our GC-Mass-Spec is capable of quickly detecting THC and related cannabinoids even in the absence of identifiable plant material.



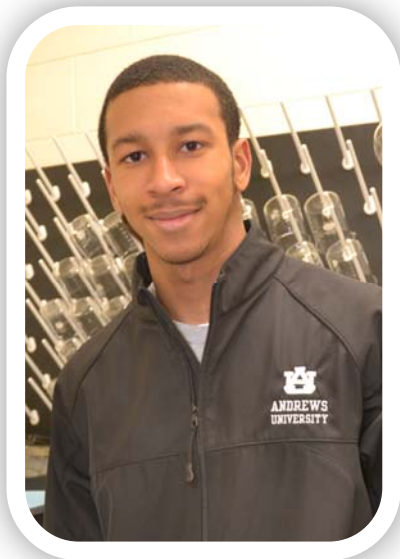
One danger that is poorly recognized by consumers of these products is that they have increased potency. The concentration of active ingredients is higher than many expect. For this and other reasons, I am glad to coordinate Andrews University's effort to assist local law enforcement to keep Southwest Michigan a great place to live and learn.



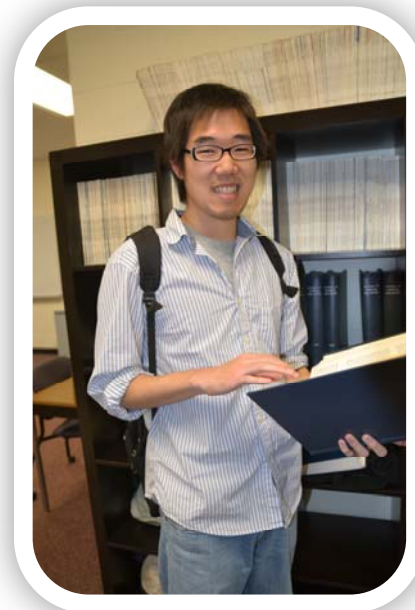
~ John Rorabeck
Director BCFL

E-mail alumni updates and pictures to David Nowack at chemistry@andrews.edu

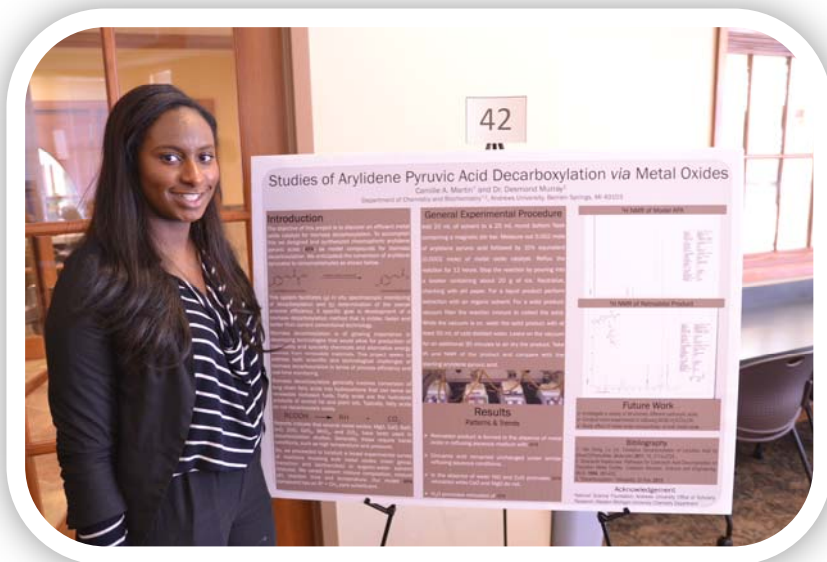
We Say Good-bye to our 2014 Graduates.



Stephen Gilbert, BS Biochemistry, is heading to graduate school to study chemistry.



Jonathan Lee, BS Biochemistry, is studying pharmacy at Loma Linda.



Camille Martin, BS Chemistry, is attending graduate school at Northeastern University in Boston.



Hwuk Chan Woo (Ryan), BS Biochemistry, is at Loma Linda Dental School.