



the Periodical

Southern Adventist University Chemistry Department



Chemistry Club serves others

By Olivia Londis

The Chemistry Club had a great time this year participating in several events while serving and socializing together.

The Chemistry Club started the year with the annual fall vespers, which included delicious food, fellowship around the fire, and a worship talk by chemistry professor Herman Odens.

The club also participated in the community Fall Festival at Veterans Memorial Park in Collegedale.

During the fall semester, club members decorated the entire chemistry floor for National Chemistry Week to educate students about how chemistry can be used to solve mysteries. Club members put up posters that showed how to determine whether money and paintings are real or counterfeit.

The club also enjoyed the



Chemistry majors Emily Mulder, left, and Suzie Lee shell corn during Community Service Day at Red Clay Farm, a farm that grows only organic produce.

annual pumpkin carving party at the house of chemistry professor Bruce Schilling, and the professors and chemistry majors became better acquainted.

Toward the end of the semester, the club went to the Samaritan Center on a Saturday night

to help move and organize items that had been dropped off throughout the day.

During the winter semester, the Chemistry Club sold Dr. Schilling's famous pumpkin bread, which he baked for the fundraiser.

The group also enjoyed a vespers during which Dave Ferguson, senior pastor of the Collegedale Church, preached about spending daily time with God.

In January, the club participated in MLK Community Service Day by going to Red Clay Farm, grower of exclusively organic produce. About 35 students helped with planting, weeding, and other farm work.

Finally, the Chemistry Club continued its tradition of helping the Samaritan Center by putting together puzzles to confirm their suitability for resale. The students enjoyed the chance to socialize and have lunch together.

Embracing science and biblical truth

As I write this, plans are being made for the March for Science to be held in Washington, D.C., and hundreds of other locations on April 22.

The goals of the march are to advocate for the role of science and scientists in shaping public policy, improve communication between scientists and the rest of society, support scientists by promoting funding for their work and allowing them to share research results without fear of misrepresentation or retribution, and increase opportunities for people from all backgrounds to learn science and become scientists.

In the broad sense, these goals are wholly compatible with the mission and goals of the Chemistry Department. We believe strongly in the ability of science to contribute knowledge needed to deal with many of the problems we face as individuals and



Brent Hamstra

societies, and in our responsibility to communicate that knowledge clearly. We believe that science is worth generous financial support, and that the knowledge produced by science should not be suppressed or misrepresented

to advance partisan goals. The diversity of our students and alumni testifies to our commitment to make science accessible to men and women of every nation, race, and ethnicity.

Where we likely differ from many of those marching for science is in our firm belief that there is a source of knowledge above and apart from observation and experimentation.

We accept that God through Scripture has provided an additional source of truth which authoritatively shapes our interpretations of the things we observe.

Because we take Scripture as the basis of our worldview, we are led to different

conclusions in some areas, leading to friction and conflict. That friction and conflict is often internal as we wrestle with how to explain apparent contradictions between the testimony of Scripture and the results of scientific investigation.

The solution to that conflict is not to march against Scripture or against science—it is to march for truth. That is what we will continue to do. We march on despite those who look on us with suspicion because we embrace science and despite those who look on us with suspicion because we embrace Scripture.

We remain grateful for the students who have marched with us over the years, for our colleagues across our campus who support us as we march, and for the alumni and friends who continue to support us in various ways as we uphold our university's mission to nurture Christlikeness, traditional Seventh-day Adventist values, academic excellence, and a lifelong pursuit of truth, wholeness, and service.



Nishino recognized with Outstanding Senior Award

Melissa Nishino, who is pursuing a bachelor of arts in chemistry, was presented with the Outstanding Senior Award by the Chemistry Department at the Senior Recognition Banquet on April 2. We congratulate Melissa on her achievements.

The bad teacher: Chemistry major learns lesson as student missionary

By Justin DeLuca

“Mr. DeLuca! Mr. DeLuca! I don’t understand how I am supposed to do this,” exclaimed one of my students.

Just as I got to her desk, the bell rang and the room was instantly filled with chaos as my students left to go to their next class. After the classroom emptied, I sat down at my desk in despair. It was the first week of November, and teaching chemistry was still a struggle for me.

During the 2015-16 school year, I left Southern and went to the small island of Palau in the Western Pacific Ocean to serve as a student missionary. My job was to teach high school science and math classes at Palau Mission Academy.

I had never taken any education classes and was really struggling to be an effective teacher.

I knew God had called me to this mission, but at this time, it did not seem like that was the case. I had been teaching for a while and was struggling to instruct productively.

As I sat at my desk at the end of this long day, I felt terrible about my situation. Here I was, thousands of miles away from home and family, volunteering a year of my life, and yet I felt as though God had left me high and dry.

I complained aloud to God, “Why did you send me here, God? I am a terrible teacher, I miss home, and I just don’t care



Justin DeLuca spends time with the freshman class during a school sporting event on the small island of Palau in the west Pacific Ocean.

anymore.”

As I continued this fierce, one-sided conversation with God, I started to break down a little bit as I thought of the next seven months of teaching.

“It has to get better or I will die,” I thought to myself.

In March, when the school year was winding down, I had become significantly better at teaching, yet I still felt I was the worst teacher at the school.

At the end of one of my classes, a student gave me a note that said the following:

“Mr. DeLuca, thank you so much for coming to teach us. I know that you find it hard to teach and get frustrated at times, but I’m happy you are my teacher. I used to dread science classes because I never

understood them, but since I have taken your chemistry class, I have started to enjoy it because you took the time to explain it to me. Thank you for being so nice to us and for always being real with us. I can see God in you.”

As I read this letter, I teared up, realizing that this entire time I was not teaching—I was just standing up front using oxygen and sweating profusely. God was the one teaching. I realized that my mission was not to be a great teacher to these kids, but instead to be a person in their life that actually cared about their well-being.

If you are willing to go where God has called you, people will be blessed. God can make anyone a master teacher.

Student conducts research at N.C. State

By Jonathan Mancao

Last summer, I had the privilege of participating in a Research Experience for Undergraduates at North Carolina State University in Raleigh, N.C., funded by the National Science Foundation. I discovered this opportunity with the help of Jan Cathey, associate professor of chemistry.

As an undergraduate working with graduate and post-doctoral students, I felt a mix of performance anxiety and imposter syndrome. Luckily, my principal investigator, Amy Grunden, professor of microbiology at N.C. State, and others in the lab provided assistance as I took on an independent research project.

I stayed busy with my investigation, but on some days, as an undergraduate, I was delegated to prepping hundreds of petri plates, washing carts full of glassware, and autoclaving bags of biohazardous waste that I hoped were sealed properly.

For my project I looked at two bacterial strains of *Paenibacillus*



glucanolyticus that were unique in that they can degrade all of the components of the plant biomass called lignocellulose: cellulose, hemicellulose, and lignin. Although the two strains were isolated from completely different areas—one from Amazonian rainforest soil and the other from black liquor, a byproduct of the paper mill industry—it was interesting to see that they share an almost 90 percent genetic similarity. We were characterizing the secreted proteins of these bacteria for their potential applications in consolidated bioprocessing, which means supplying renewable, non-food source biomass to these organisms. These organisms can convert biomass to various industrially viable compounds like biofuels, plastics, films, and foams. Many of these compounds

mentioned are currently petroleum based, so the benefits of this proposed application include reduced fossil fuel consumption and greenhouse gas emission.

Over the course of 10 weeks, I tested for genetic tractability, conducted growth optimization experiments, and used LC-MS/MS along with proteomic databases to identify key enzymes in lignocellulose degradation. I gave weekly progress reports to my principal investigator, periodic presentations about my project to others in my research group (all students in my program had their own projects), and ultimately, a poster presentation of my work at N.C. State's annual summer research symposium. Future REU participants will be able to continue my work, and the data I

obtained was included in a journal article. As an undergraduate student, it's incredible to get to co-author an article coming out of the Research Triangle.

At the end of the summer, I reflected on my time at N.C. State. I was exposed to a professional environment, lived at a public university in a new city, and met brilliant students involved in research endeavors. I was nostalgic and proud (and the stipend wasn't shabby either).

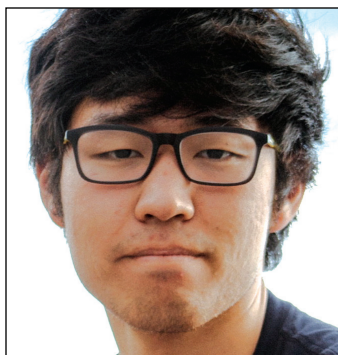
I am thankful to North Carolina State University, the National Science Foundation, and to Southern chemistry professors Brent Hamstra and Loren Barnhurst who wrote recommendation letters for my application. Undergraduate research is an amazing experience and I highly encourage those who are able to participate.

May 2017 graduates



Drew Blake
B.S., Biochemistry

Future plans: Attend
medical school at Loma
Linda in the fall



Zubin Chang
B.S., Biochemistry

Future plans: Attend
medical school at Loma
Linda in the fall



Dalton Day
B.S., Biochemistry

Future plans: Attend a
post-bachelor program in
pre-dentistry



Melissa Nishino
B.A., Chemistry

Future plans: Attend
medical school



Alex Pinkard
B.A., Chemistry

Future plans: Attending
nursing school in the fall



Esther Ramley
B.A., Biochemistry

Future plans: Attend
medical school at Loma
Linda in the fall



Melanie Roman
B.S., Biochemistry

Future plans: Attend
medical school at Loma
Linda in the fall



Lee and Min accepted early to dental school

Southern chemistry majors Krista Min, left, and Suzie Lee have been accepted into the Loma Linda University School of Dentistry following completion of their junior year. Acceptance to dental school without completing a bachelor's degree is a rare and noteworthy accomplishment, for which we congratulate Krista and Suzie.

BIBLICAL APPLICATION

God: The Divine Investigator

By Brent Hamstra

In the beginning, God investigated. According to the creation account in Genesis, investigation was an important part of God's creative activity. In Genesis 1:4, 10, 12, 18, 21, and 25, we find the same record of investigation. First, "God saw..." — the light, the separation of earth and sea, the plants, the sun and moon, the sea creatures and birds, the living creatures on land — and He decided that "it was good." In verse 31, His creative work concluded when "God saw all that He had made, and behold, it was very good."

We don't often think of these words as an investigative record, but they are. God observed the work He did, and then evaluated His work based on that observation. This is exactly the thing we as scientists do all the time — we observe something in nature or in that controlled portion of nature called the laboratory, and we evaluate it. As Genesis provides the history of the origin of the earth



and its inhabitants, it also presents the origin of basic scientific inquiry.

Why does an all-knowing, all-seeing, all-powerful God need to investigate at all? Clearly, God doesn't investigate to find out something He doesn't know, and knowledge isn't something that requires His time and effort to obtain. It seems there are two purposes in God's investigations. First, God's investigations make knowledge known to others. Sometimes that involves His making others aware that He knows what they know. Second, God's observing, evaluating, investigating work is provided as an example for us. As Paul wrote to the believers in Rome, "For whatever was written in earlier times

was written for our instruction..." (Rom. 15:4). God's record of investigation in Genesis is given to show us how we are to investigate.

There are several accounts in which God is observing people in Genesis. God told Cain that his brother's blood was crying out from the ground. God saw the wickedness of the antediluvians and the righteousness of Noah. He saw those who were building a tower on the plain of Shinar after the flood. He told Abraham that an "outcry" came from Sodom and Gomorrah, and went to see the inhabitants of Sodom. He saw Hagar after she left Abram and Sarai in Genesis 16, and told her to name her son Ishmael, meaning "God hears." God later heard the cry of Ishmael when

Hagar fled a second time. He saw that Leah was being neglected by Jacob in Genesis 29. And He heard the frustration of Leah and Rachel as they desired to have children. In each of these cases, God evaluated the situation after He observed the situation, and He always acted on the revealed information.

When we undertake investigations in the sciences or in any other area of study, we are not engaging in a process that is inherently contrary to Scriptural principles. In fact, when we investigate like God investigates, we are acting in harmony with Scriptural principles. In a world where some believe that scientific inquiry is in opposition to faith in God and that Christians must set aside their faith to succeed in science, and others believe that Christians must set aside scientific inquiry in order to preserve their faith, God Himself provides a model in Genesis for those who seek to investigate in a way consistent with Scripture. It is a model worth emulating.

ALUMNI SPOTLIGHT

Rebecca Ruf, PA-C

1. What years did you attend Southern Adventist University?

I attended 2001-2007. I served a year as a student missionary in Romania.

2. What attracted you to Southern?

It's a family tradition and a lot of my family lives in the area. Southern is strong in their science departments, music and liberal arts.

3. Why did you choose to study chemistry?

It was my favorite subject in high school. Chemistry provides a good mix of logic, challenge, and fun.

4. Describe your experience at Southern.

I was involved in Chemistry Club. I was vice president my junior year and president my senior year. I also was a reader and lab teaching assistant. I have many memories, including grading parties and making valentines for the assisted-living center and being in chorale.

5. Where was your favorite place to study?

The conference table in the third-floor study room in Hickman Science Center. On any given day, five to seven students would be there studying organic chemistry.

6. What was your favorite class?

I really enjoyed the Advanced Organic class. We focused a lot on medicinal chemistry; it was the chemistry class that has been foundational for practicing medicine.

7. Tell us about your life immediately after Southern.

I worked in a hospital for a year. Then I attended Union College for my master's degree in physician-assistant studies. I'm currently a physician's assistant in Cherokee, N.C.

8. What are your plans for the near future?

I am getting married in May!



Chemistry Department graduate Rebecca Ruf plans to marry her fiancé, Travis, in May.

9. What experiences at Southern helped in your professional and/or personal life?

I would recommend taking the classes which really interest you. It's important to be an empathetic, passionate, and well-rounded person who can connect with people.

10. What advice do you have for current students who want to make the most of their time at Southern?

Be involved! I was kind of shy. For students who are overwhelmed with large crowds and spaces like I was, join smaller clubs or find a smaller Sabbath school. Join the Chemistry Club or the Biology Club or join the chorale if you love music. Find a book club on campus or start one.

Note: This interview has been edited for brevity and clarity.



SOUTHERN
ADVENTIST UNIVERSITY

Power for Mind & Soul

Chemistry Department
P.O. Box 370
Collegedale, TN 37315
Phone: 423.236.2931
Fax: 423.236.1931
southern.edu/chemistry

Non-Profit Organization
U.S. POSTAGE
PAID
PERMIT NO. 7
Collegedale, TN 37315
Car. Rt. Presort

Faculty and Staff

Loren Barnhurst, Ph.D.
Jan Cathey, M.S.T.
Brent Hamstra, Ph.D.
Mitch Menzmer, Ph.D.
Herman H. Odens, Ph.D.
Bruce Schilling, Ph.D.
Rhonda Scott, Ph.D.
Heidi E. Olson, Office Manager

Forensic Science Camp students to explore chemistry, crime

The Chemistry Department is offering its Forensic Summer Camp on the campus of Southern in early June.

The three-day camp runs from June 5 to 7 and will include the opportunity to explore chemical techniques and analytics relevant to criminal investigations. Participants will increase their understanding of fundamental chemistry concepts through practical applications by using modern

instrumental techniques to explore areas of chemistry such as explosives, water quality, biochemical analysis, spectroscopy, and fluorescence.

The instructional team will be led by chemistry professor Jan Cathey and former forensic investigator Emily Hamstra.

Chemistry Department professors Brent Hamstra, Loren Barnhurst, Bruce Schilling, and Mitch Menzmer will provide background instruction and assist students

with activities.

Chemistry Department professor Rhonda Scott and office manager Heidi Olson will assist with the camp.

Participating students are required to have completed a year of high school-level chemistry and be interested in pursuing a career in or related to the sciences.

For more information or to register, call Jan Cathey at 423.236.2201 or email her at ljcathey@southern.edu.