

MOLECULAR SIEVE

Andrews University

Department of Chemistry & Biochemistry

An American Chemical Society Approved Program since 1976

Fall 2021

Andrews Alumnus Contributes to COVID-19 Vaccine Development

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Dr. Kizzmekia Corbett, NIH

Once again, we thank Dr. Murray for an excellent roster of seminar speakers. Two were especially relevant this year in addressing the current crisis with COVID-19.

In January, more than 500 people welcomed Dr. Kizzmekia Corbett to campus via Zoom as she presented her work with National Institute of Health, as a leader of the group using messenger-RNA to create the Moderna COVID-19 vaccine.

Besides sharing some of the details of the biochemistry and how the technology has been in development since the SARS outbreak in 2002, Dr. Corbett shared how her undergraduate experience was enriched through the ACS Project SEED program. She spent her summers in laboratories, and began her relationship with NIH during one of these summer internships. She has been working in microbiology and immunology in the NIH's Vaccine Research Center since her postdoctoral fellowship in 2014.

In April, our own alumnus, Dr. Roger Pak, gave a seminar on his work with Pfizer-BioNTech's Project Lightspeed. He described some of the intricacies of chemical design principles that allow lipid nanoparticles to deliver RNA to cells in order to present protein antigens to the immune system. These lipid chemical design features were



Dr. Roger Pak, Pfizer

critical to the success of the Pfizer COVID-19 vaccine.

Dr. Pak graduated from Andrews in 1988 and is an associate research fellow in the Novel Delivery Technologies group in the BioTherapeutics Pharmaceutical R&D department at Pfizer. He has over 20 years industrial experience industry. He held fellowships at the City of Hope National Cancer Institute, the University of Notre Dame, and Argonne National Laboratories. At Pfizer, he leads the efforts on covalent technologies related to biotherapeutic drug delivery.

Thank you to Dr. Corbett and Dr. Pak for sharing some of the science behind these impactful contributions.

Creation Chemistry



Drs. Dave Nowack and Ryan Hayes are part of a small group of PhD chemists and biochemists that are developing a series of short cartoon-based videos to explain the unlikeliness of abiogenesis (life from non-life). External funding facilitated them contributing scientific information and perspective that suggests that the biomolecular building blocks needed for life cannot be formed “naturally.”

The first of six videos premiered last August on two YouTube channels. Discovery Institute’s channel presents scientific support for Intelligent Design. The second YouTube location is on the Long Story Short channel.

The group secured a grant from the Faith & Science Council of the General Conference of SDA to support the graphic artist production work along with advertising. This first video was viewed over 140,000 times in the first two months. The second video will be released on November 30, 2021 at 9 pm EST, on YouTube.

(Discovery Institute)

<https://www.youtube.com/watch?v=MFTnwriQRi8>

(Long Story Short)

<https://www.youtube.com/watch?v=5FLhC4OiOTU>



Dwain Ford at Rest

It is with great sadness that we report that Dr. Dwain Ford, emeritus faculty member, passed away in mid-November as we go to press. Dr. Ford was a long-time “force” in the department, starting at Andrews in 1962, retiring in 1992, and continuing to engage with the department until the last few years.

He was a great teacher, who faithfully helped thousands of students do their best decade after decade. Over the past years, numerous alumni have revealed how Dr. Ford positively affected them. Dr. Ford’s ability to motivate students to excellence while caring for each one, to encourage them in varied areas of their lives, remains inspirational for so many.

Dr. Ford was also a great leader for our department. He built on the legacy of previous faculty and put the department on the trajectory of delivering outstanding education in the chemical sciences that continues today. He initiated the BS degree, established ACS accreditation, launched chemistry seminar, and hired several long-serving faculty members, who have themselves now retired.

In recognition of his broad impact, we intend to dedicate the fall 2022 issue of the *Molecular Sieve* to Dr. Ford and share many of the memories that you may have of him and articulate the influence he had on your lives. At press time, we are developing specific departmental plans to remember this mighty man of God, Andrews, and The Department of Chemistry & Biochemistry. It seems logical to organize a program during the next alumni weekend, September 22-25, 2022.

Watch for a postcard in the spring with further information, or feel free to e-mail us at chemistry@andrews.edu. If you’d be interested in participating in a symposium, please let us know.



Quant Lab Coats—The Tradition Continues!



Congratulations to all the brave new analytical chemists in Quant this fall, who earned their own lab coats.

Front: Justin Corbett, Dr. David Randall, John Roosenberg, KiHeon Chung, Andrew Wee, Nick Zeismer
Back: Anneliese Tessalee, Gabi Francisco, Yishan Jin, Anaya Abdul-Haqq,
Rekha Isaac, Olivia Joyce, Alannah Tjhatra

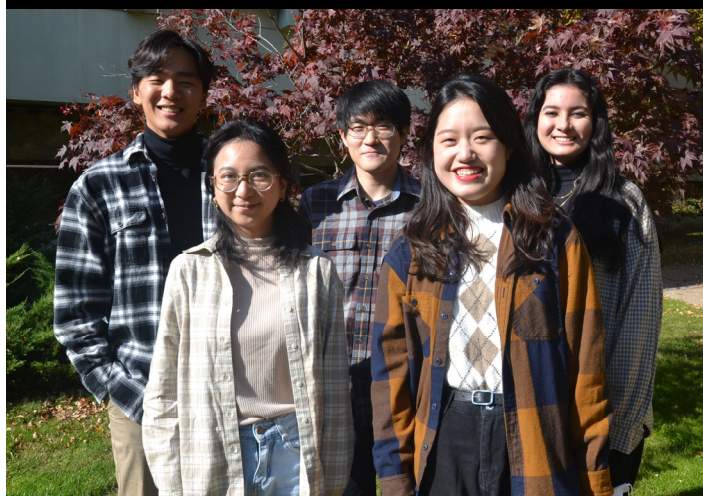
ChemClub Officers



Student Club for Chemists, Biochemists, Friends

Jongwan Bae, Sergeant at Arms;
Andrew Wee, Social VP;
Ashley Kim, Treasurer;
Emma Suvacarov, Vice President;
Aidan Li, Secretary;
Hannah Castillo, President;
Isabella Tessalee, Spiritual Vice President;
Dr. Ryan Hayes, Sponsor;
Zoë Gentles, Public Relations

Gamma Sigma Epsilon



Chemistry Honor Society, ΓΣΕ

Joshua Pak, President;
Daranthea Atmadja, Vice President;
Jongwan Bae, Sergeant at Arms;
Chaehyun Kim, Secretary/Recorder;
Hannah Castillo, Treasurer

Not Pictured: **Dr. Lisa Ahlberg**, Sponsor

2021 Graduates & Awards

2021 Undergraduate Degrees

Jasmariee Anderson, BS Biochemistry

Daniel Chi, BS Biochemistry

- ◆ Summa Cum Laude
- ◆ American Chemical Society

Kieun Chung, BS Biochemistry

- ◆ Summa Cum Laude

Jemuel Curameng, BS Biochemistry

Sofia Hanapin, BS Chemistry

Aaron Jacobs, BS Chemistry

- ◆ Summa Cum Laude
- ◆ JN Andrews Honors Scholar
- ◆ American Chemical Society

Cindy Murillo, BS Biochemistry

Kaitlyn Steeves, BS Chemistry

Theo Sumampouw BS Biochemistry

- ◆ Cum Laude

Faculty & Staff

Faculty:

Lisa Ahlberg, PhD

Ryan Hayes, PhD

Getahun Merga, PhD

Desmond Murray, PhD

David Nowack, PhD

David Randall, PhD

Staff:

Dana Johnston, MS

John Rorabeck, MS

Rebecca Turk, BS

Scholarships

Scholarships 2020-2021 school year

Lois K. Mutch Scholarship

KiHeon Chung, Justin Corbett,
Nicholas Jasper, Taehyun Kim

Dwain Ford Scholarship

Julia Randall

Richard Cook Scholarship

Hannah Castillo, Olivia Joyce

Thomas Mullin Scholarship

Jonathan Lee, Jason Mokuu

Theodore Hirsch Scholarship

Elizabeth Borton, Christine Choi,
Nels Wangsness

Minesinger Scholarship

Chaehyun Kim, Isabella Tessalee,
Gabriel Wilson

Robert Wilkins Scholarship

Daranthea Atmadja, Owen Faehner,
Alyssa Henriquez, Grant Sajdak

H. F. Halenz Scholarship

John Roosenberg, Yunji Song,
Andy Zhao

Glen Abbot Scholarship

Emma Suvacarov, Anneliese Tessalee

Ralph Scorpio Scholarship

Jongwan Bae, Joshua Pak,
Alannah Tjhatra, Andrew Wee

Hall & Miller Scholarship

Zachary Alignay, Emily Atencio,
Joya Dean, Doyun Kim, Nicholas Zeismer

Max & Linda Taylor Scholarship

Anaya Abdul-Haqq

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Alumni Notes

Jesse Gray (BS Biochem '19)

This April I published an article titled, "High-performance Organic Pseudocapacitors via Molecular Contortion," in the journal *Nature Materials* based on my research at Columbia. Pseudocapacitors harness unique charge-storage



mechanisms to enable high-capacity, rapidly cycling devices. Here we describe an organic system composed of perylene diimide and hexaazatrinaphthylene. We incorporate the material into two-electrode devices for a practical demonstration of its potential. By

underscoring the importance of molecular contortion and complementary electronic attributes in the selection of molecular components, these results provide a general strategy for the creation of organic high-performance energy-storage materials.

Tammy Leong (BS Chem '18)

Time flies! My years at Andrews and having Dr. Randall as an advisor gave me a strong foundation and has benefited me in grad school these last 3 years. I really appreciate it.

This spring, I published a first author paper in *J. Chem. Phys.*, "Unidirectional Coherent Energy Transport via Conjugated Oligo(p-phenylene) Chains." I have another co-first author paper from 2020 which was published in *J.C.P. Letters*, "Low-Temperature Vibrational Energy Transport via PEG Chains."

At Tulane, I joined a physical chemistry group which focuses on 2DIR. Of all divisions of chemistry, I like physical the most. Math is fun too.

Grad school is difficult, especially during the pandemic, and I also had some physics (especially optics) that I had to learn from scratch. But I have been progressing smoothly through my program. In December 2020 I presented my prospectus, finished my coursework, and was admitted to candidacy.

Emily (Bankes) Ott (BS Chem '16)

I have finally finished! This April, I defended my PhD from Penn State, and I have started a new job as the lab manager for the Matheson Tri-Gas facility in Palm PA.



If you are interested, you can read an article I co-authored in *J. Phys. Chem.*, Dynamics of Liquid-Liquid Phase Separation in Submicrometer Aerosol.

I just want to say thank you Dr. Randall, for all your help in getting me started with my grad school process.

Rosanne Thornhill (BS Biochem '15)

Hope all is well with you! I'm currently at Loma Linda, in my third year of general surgery residency, still hoping to pursue a fellowship in cardiothoracic surgery in the future.

I've picked up a few hobbies—mostly painting.

Just want to thank the Chem Department for being such a huge support to me during my time at Andrews. Working with you, Dana, was one of my best college experiences. To this day, I still remember your conversation before my med-school interview. Thank you.

I miss you all, and hope to see you again sometime soon.



Krista Motschieder (BS Chem '92)

I went to graduate school in organic chemistry at UCLA. I got my MS and PhD there with Dr. Miguel Garcia-Garibay, and studied the reactions of carbenes formed by the photolysis reactions of diazo compounds.

I started teaching at La Sierra University in 2002, and have been teaching here ever since! I teach organic chemistry courses (lower division and upper division) as well as a course for our Honors Program and a class that focuses on scientific ethics. I sincerely love my job, and I am now serving my second year as Chair of the Department of Chemistry and Biochemistry. My husband of 22 years, Dr. Jeffrey Brand, was a Biochemistry major at Atlantic Union College and got an MS in organic chemistry at University of California Riverside before going to medical school at Loma Linda University. We have two daughters - Karennia (15) and Nadia (13).

I have many great memories of my time and Andrews, but I mostly want to honor the faculty

(Continued on page 6)

Alumni Notes

who had such an influence on me. Dr. Dwain Ford, Dr. William Mutch, Dr. Robert Wilkins, and Dr. Peter Wong were inspiring and dedicated teachers and mentors. They helped me fall in love with chemistry and encouraged me to go to graduate school. Beyond that, they made the chemistry department a warm and welcoming place for students. And they had a positive effect on the development of chemistry faculty at our Adventist colleges and universities. You can look at the list of chemistry faculty at many Adventist institutions in the US (and probably worldwide as well!) and find somebody who came through the Andrews Department of Chemistry and Biochemistry. There are three here at La Sierra alone: myself, Dr. Sarah (Brantley) Herrmann, and Dr. Marco Allard. A quick search of the websites of just four other schools found ten more! And I also saw a number of new faculty who have graduated fairly recently from one of those schools and undoubtedly were taught by some of us who were taught by Drs. Ford, Mutch, Wilkins, and Wong. Their academic grandchildren, if you will! I am proud to say that there are two who were my students here at La Sierra (Dr. Michael Gutierrez, my colleague now at La Sierra, and Dr. Matthew Duffy, at Southern).

So, many thanks to the faculty of the AU Department of Chemistry and Biochemistry, past and present, for all they have done and continue to do for their students. We alumni are grateful to them for the impact they had on us, and their leadership continues to be felt as we in turn educate new generations of students.



Dewey Murdick (BA Chem '68)

Dewey shares that he was recently honored by the American Red Cross for the 484 lifetime units of blood products he has donated. His platelets have been used for cancer patients, to assist during surgeries, or to help with various blood disorders. But, for Dewey, it is the tiniest recipients that most warm his heart.

Dewey has donated blood in every place he has lived since he was 23 years old. Because Dewey donates 20 times a year, and because his blood type makes him a universal platelet and plasma donor, his assistance has helped many people. He is especially touched by the needs of young children with acute lymphoblastic leukemia and babies born with special needs. He plans to keep giving as long as he is able, and encourages all of us to join him.



Don Halenz (BA Chem '57)

My wife and I have had an interesting and varied life. I collected a PhD from Virginia Polytechnic Institute and spent 5 years as an assistant/associate professor at Andrews. From there we accepted a call to Philippine Union College where I was a chemistry teacher, then to Mountain View College (South Philippines) where I served as academic dean and then president for 4 years. From there I was called to Indonesia as president of Indonesia Union College. For six months we studied the language, but a work permit could not be obtained for us, so we were transferred to Singapore where I was the third principal of Far Eastern Academy to finish out the school year. The next four years were spent at Southeast Asia Union College as president.

After 13 years in the Far East, we returned to the US for our children's education. We spent 40 very happy years in Angwin, CA, 21 years teaching chemistry, 5 years as associate academic dean, and 14 years in retirement. Our three daughters all finished college at Pacific Union College. We now live in Laurel, MD near our daughter, Denise, and her husband Randy Robinson.

Fredrick Harrison (BA Chem '47)

I graduated with a premed diploma in class of 1947; and then in absentia with the class of 1951 with BA. In 1952, I received an MD from Loma Linda College of Medical Evangelists. At age 95, I have no more news for your publication.

Department Response:

Such a pleasure to hear from all our alumni.

Mole Day 2021

Do you remember ChemClub? The students have enjoyed actively re-embracing the possibilities of fellowship now that the university's COVID-19 protocols are more relaxed than during the early days of this pandemic.

On the fourth Friday of October, over 50 people celebrated outside with a haystack extravaganza featuring guacamole, *lemole*-nade, games, campfire, liquid nitrogen ice cream, periodic table cupcakes, and 'smores. This was followed by spiritual reflections from Dr. Nowack and two students.

Though it wasn't technically on 10-23, we did not neglect to recognize our hero Lorenzo Amedeo Avogadro and his wonderful mole!



Summer Chem Workshop

In May 2021, our STEM enrollment coordinator, Mrs. Monica Nudd, secured external funding from a VersaCare Foundation grant administered by Loma Linda University (LLU). The broad and worthy goal of the grant was to augment K-12 science education in primary and secondary SDA schools in North America. We learned of this opportunity in mid-April; the goal was to deliver this during the summer of 2021. This provided only a few weeks to develop and deploy the project.

Our engineering colleagues hosted a week-long on-campus event. The chemistry department team adopted an entrepreneurial spirit to deliver a remote-format chemistry workshop with the overarching goal of lowering barriers to putting hands-on science activities in the hands of teachers. Forty-seven K-12 educators from across the NAD expressed interest, however grant funding was limited to support 23 participants who joined in three half-day workshops over Zoom timed to work over most of continental North America.

Prior to the workshop, we assembled & shipped lab kits that included some supplies and student-safe chemicals to augment materials that teachers could buy at their local grocery store. While we strongly believe in the value of in-person labs, this format worked engaged K-12 educators from all over the US and Canada and provided professional development for teachers who are also parents or have other summer responsibilities. Recent alumna, Ms. Maya Turon, ably assisted Dr. Ahlberg doing 13 different hands-on food-chemistry related activities during the Zoom sessions. After the workshop, we assembled and sent a lab kit to participants who requested them for use in their own schools. Each kit supports five student groups.

The relationships built with K-12 educators and the enthusiastic feedback from teachers who implemented these experiments are highly valued. We'd like to thank LLU and recognize the team for this project: Dr. Ahlberg, Mrs. Johnston, Mrs. Nudd, Ms. Turon, and Dr. Randall.



From the Chair

Dear Alumni

Your department has been blessed this past year. We are all back on campus, wearing masks in indoor spaces, but grateful that many of the COVID-19 restrictions from last year have been lifted. Our faculty continue to do outstanding work and adapt to the ever changing needs of the department. Each faculty member contributes to the experiences of Andrews students in unique and positive ways.



In last year's issue, we shared the vision of enhancing the longevity of our instrument fleet. We are thankful for alumni support of this project which allowed us to upgrade the computers (and software) controlling our Nicolet FTIR instrument, Cary UV-Vis spectrometer, and the Agilent HPLC system as well as calibrating our analytical balances. Looking forward, our Agilent quadrupole GC-MC system, our OES ICP instrument, and fluorescence spectrometer will all need similar upgrades in the near future.

Two of our smaller instruments which date from ~20 years ago, the desktop Raman spectrometer and an electrochemical potentiostat, now urgently need to be replaced. These instruments are no more than \$13,000 and I feel that our alumni could partner with the department in support of this. As so many of you know, the hands-on experience our students get with instruments, both through research and upper-division analytical chemistry courses, is invaluable because it helps our graduates stand out as they seek jobs directly after graduation.

The department's enrollment in the fall of 2021 matches fall 2020, which was up from fall 2019, the last normal pre-COVID fall. We are happy that God continues to inspire young people to be interested and amazingly talented in the chemical sciences. And we are pleased that Andrews continues to provide a place where students can develop their gifts in a vibrant & supportive community of chemists & biochemists.

I would invite each of you to pray for your fellow alumni. Life always brings us challenges, some very big, but the past two years has been difficult for so many people – including some of you. We pray that the God of peace will bring peace to you at this time.

Forensic Lab Report

Those of you who have been regular readers of the "Mole Sieve" have come to expect the consistent reports from our Berrien County Forensic Lab (BCFL). Embedded within the Department of Chemistry & Biochemistry at the behest of the Prosecutor's Office since 1972, Andrews University has been providing reliable and timely drug analyses to the local court system for five decades and 2021 has been no exception.

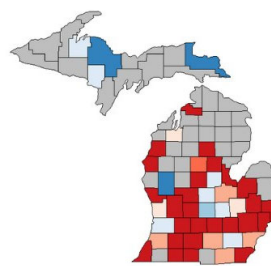


So, for this issue, I would like to highlight a lesser known aspect of the work of BCFL: education. Each of the four directors (Lloyd Kuhn, Dale Gooden, Dewey Murdick, and John Rorabeck) have periodically taught CHEM 410, Forensic Chemistry, to eager students exploring forensic science. Beyond the science complex, these educators have reached out to provide lectures and seminars for disciplines ranging from social work and behavioral science to biology and medical lab science. Our connections with law enforcement have opened doors to lecture in local community college classrooms. Along with Behavioral Science Chair Harvey Burnett (sworn police officer) we have addressed the new Andrews residence hall advisors on current drug trends, paraphernalia and attitudes to improve their ability to recognize and mitigate problems in the dormitories.

In September, I responded to a communication from the Michigan branch of the office of National Drug Control Policy (NDCP) requesting statistics on drug trends in Berrien County. The data that I was provided was just what was needed in a collaboration between the MI Health and Human Services and the National Emerging Threats

Initiative (NETI). Oddly enough, upon hearing of our lab from local law enforcement contacts, they had searched for "Andrews University Chemistry" and found and read some back issues of Molecular Sieve. Go figure!

Change in naloxone use by EMS
March-Sept. 2019 vs 2020



red: over 30% increase in 2020 dark blue: over 20% decrease in 2020

Data from NDCCP

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

Farewell 2021 Graduates



Pictured above from left to right:

Kieun Chung is at Loma Linda University School of Medicine;
Sofia Hanapin is in California working for Thermo Fischer;
Kaitlyn Steeves is still in the area working for Great Lakes Scientific;
Jasmariee Anderson is taking a gap year before applying to medical school;
Daniel Chi at Loma Linda University School of Medicine;
Aaron Jacobs is at Michigan State University for a PhD in organic chemistry;
Theo Sumampouw is at Loma Linda University School of Medicine;
Jemuel Curameng is taking a gap year before applying to medical school.

Not Pictured:

Cindy Murillo is working in Chicago for AbbVie Lab.

Happy Holidays


From your Department of Chemistry & Biochemistry



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Your latest
Molecular Sieve inside!

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