

The

MOLECULAR SIEVE

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

An American Chemical Society Approved Program since 1976

Fall 2012

Dr. Murray College Science Teacher of the Year

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Dana Johnston, MS
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Desmond Murray, assistant professor of chemistry in the Department of Chemistry & Biochemistry at Andrews University, was selected by the Board of the Michigan Science Teachers Association (MSTA) as the College Science Teacher of the Year for 2012. Murray was formally recognized at an awards ceremony on March 9, 2012, at the 59th Annual MSTA Conference in Lansing, Mich.

This award is given to science teachers in four areas: elementary, middle school, high school and college. The winning teachers are chosen for their use and modeling of best practices, inspiring their students, demonstrating innovative teaching strategies, being excellent role models for students and fellow educators, demonstrating leadership, and exhibiting a passion for science and teaching.

Other 2012 science educator awardees are: Mary Lindow, Battle Creek Area Math and Science Center (High School); Susan Tate, Whitehall Middle School (Middle School); and Rebecca Durling, Discovery Elementary School (Elementary School). Gary Abud of Grosse Pointe North High School received Science Teacher of Promise and the Informal Science Educator of the Year was awarded to Sarah Halson, environmental education manager at The Greening of Detroit, a non-profit organization.

Murray says, "I believe my single most important teaching innovation is promotion, implementation and continuous improvement of early research participation (ERP) at both the high school and college levels. This provides youth with unique opportunities to conduct authentic research four to eight years before it is traditionally done. The implementation of ERP at the high school and college levels has clearly demonstrated they are capable and eager to begin early research participation."

Murray describes his early research participation programs as 'incubators of innovators' that engage students in research and discovery including synthesis of: sunscreen materials; sensors for toxic substances found in the environment, agricultural pesticides and chemical warfare agents; and new 'hybrid' drugs



Dr. Nowack and Dr. Murray in Lansing, Michigan for the Science Teacher of the Year Award Ceremony

that offer the potential of reducing the number and cost of drugs while increasing their efficacy.

Murray has taught at Andrews University since 1995. In addition to his college level teaching load, he also instructs grades 10 and 12 in chemistry for the Berrien RESA Math & Science Center, which is located on the campus of Andrews University. He was recognized as the "2010 Thought Leader in Education" by the *Business Review West Michigan*. Murray is passionate about his ChemSemBlog, an innovative way for chemistry and biochemistry majors to communicate online about current scientific research, and ChemSemLive, a live streaming broadcast of the Department of Chemistry & Biochemistry's weekly guest speaker lecture series. Murray also works in collaboration with the *Benton Spirit*, a community newspaper, on LabTales and ChemiVerses, a way for students to communicate science and research to a general public readership.

Murray is the founder of BEST Early (Building Excellence in Science & Technology), a nonprofit that has been providing science- and research-related apprenticeships for high school and college students for 10 years. Additional information about each of these programs can be found at www.bestearly.com.

~ Reprinted from the *Benton Spirit*

ChemClub Road Show

The Andrews ChemClub has been actively sharing a chemical perspective on God's amazing world through demonstrations at local elementary schools. At the Eau Clair SDA school, Courtney Tait and Ken Richardson (ChemClub officers) showed the students how dangerous acids and bases can be detected with a few drops of purple cabbage juice extract while Dr. Hayes narrated. The exhibit was followed by an exhilarating game of soccer with the students from the upper grades.

At Ruth Murdock SDA school in Berrien Springs, Dr. Hayes was accompanied by Ken Richardson and David Thomas (ChemClub member). Words were made to appear out of nothing when an alkaline solution was sprayed onto paper on which words had previously been written with phenolphthalein. Our young assistants were outfitted with purple nitrile gloves and safety glasses and asked to hold a large sheet of paper. We had many volunteers to choose from as each of the 300 elementary students was eager to help. Between the excitement of balloons popping and words "magically" appearing, the crowd was reaching a feverish pitch. When Dr. Hayes asked, "Who wants to be a chemist?" every hand was raised and waved enthusiastically. At the height of the fervor, we made our exit—much to the chagrin of the teachers who remained to deal with the super-excited molecules, I mean, children.

Dr. Hayes led a demonstration of acid and base chemistry at Woodside Elementary in Hartford, MI. This public school has invited the Hartford SDA church to conduct an afterschool program that engages young children with experiments and activities to help them learn about life. The 15-20 young scientists enjoyed mixing chemicals, creating solutions using plastic pipettes, and watching color changes take place with purple cabbage juice. We hope to go back to all these schools again this year and expand our outreach using thrilling chemistry illustrations.

~ Ryan Hayes



Chemistry Conference

Lisa Ahlberg attended the Biennial Conference on Chemical Education in July that was held at Penn State University. This conference is an amazing resource of and for chemical educators. Of particular interest this summer were topics on the new MCAT, molecular gastronomy or kitchen chemistry courses, and approaches to teaching organic chemistry.

The report on the MCAT exam and its effects on chemical education highlighted the continued importance of a firm foundation in chemistry while other sessions offered ideas for ways to engage students in that chemistry. This segued into sessions on approaches to teaching organic chemistry to foster an understanding of its relevance.

Further sessions on molecular gastronomy/kitchen chemistry courses were highlighted by a plenary speaker giving a very entertaining look at how he teaches a general education course on this topic. These discussions were inspiring to our own department where there is a rich history of good cooks and good cooking. Now to implement a general education course ourselves....

~ Lisa Ahlberg

Forensics Laboratory

Unknown white crystalline powders found inside Police Evidence envelopes are nothing new at the Berrien County Forensic Lab during its thirty-eight year history at Andrews University. Over the past two years, however, new suspects have joined the ranks of the usual methamphetamine, cocaine, and heroin crowd. "Bath Salts" is the name given to a collection of synthetic stimulants patterned after cathinone, a substance naturally found in the Khat plant. Clandestine manufacturers market these into a variety of products available on the internet and in "head shops" as a legal alternative to methamphetamine or 3,4-dimethoxymethamphetamine, the analogue known as Ecstasy.

Berrien County Forensic Laboratory director and analyst, John Rorabeck, is working with the Berrien County Prosecutor's office to enforce the Michigan law that places these drugs in Schedule I, the highest rank for controlled substances. Successful prosecutions have been aided by the GC-Mass Spec which was acquired through a donation from LECO corporation five years ago, and has been invaluable in the identification of substances such as methylene, dimethylcathinone, and cathine. It is a privilege to be a part of the network of professionals who get these dangerous substances off the street—and Andrews University plays a key role in that process.

~ John Rorabeck



Research Report 2012

What makes our undergraduate chemistry curriculum strong, interesting, and profitable in equipping young people for further study in graduate and professional schools? We let them research! “The heavens declare the glory of God and the firmament shows his handiwork,” Psalms 19:1. When class work is supported by sound research and findings it promotes not only excellence in secular knowledge, but to a better understanding of our Savior and Creator.

We are grateful to the university, the office of scholarly research, NSF, colleagues, and alumni for supporting our endeavors—providing us with the scientific equipment necessary for competitive research. Below are listed some of the chemistry projects being conducted.

~ Getahun Merga

The Hayes research group continues to run research in the area of nanotechnology and analytical chemistry. Our analytical work on the simultaneous determination of hydroxyl number and moisture content of highly branched polymers was presented as a talk this past March at the Michigan Academy of Sciences in Alma, MI.

Tyler Pender (Chemistry minor, Honors) recently defended our research project proposing to analyze the existence of an alternative non-creatine route to making heterocyclic amines which are well-known carcinogens. The key piece of instrumentation used in the study is the Agilent 1260 HPLC which the department acquired last year. We believe this research will have a huge impact on the cooking methods used for proteinaceous foods, including soy-based “veggie meats.”

Erica Evans (Chemistry minor, Honors) also successfully defended a research project in which we are studying the absorbance and fluorescence signals of a dimethylcyanostilbene molecule in the presence of copper (II) ions. This molecule was produced in Dr. Desmond Murray's lab. We were disappointed that this sensor was not responding in a linear way to the concentration of copper. However, we see great promise to use this molecule as an “on-off” sensor and believe interesting research lies ahead to show the selective fluorescence quenching mechanism of this stilbene with copper (II) ions.

~ Ryan Hayes

David Nowack continues to work collaboratively with Dr. Brian Haab of the Van Andel Research Institute. The current focus of the work is the development of new molecules for the detection of specific types of sialic acid glycosidic bonds, especially, the α -2,3-sialic acid bond. The current available molecules are not selective enough to be useable as detection tools. Our investigation is using a protein from the bird flu virus (haemagglutinin, HA) to effectively attach to the α -2,3-sialic acid bond. Once the HA protein has been verified as accurately binding the 2,3 bond, we will use the HA protein to detect changes in human blood sera that accompany changes due to pancreatic cancer.

~ David Nowack

David Randall spent some time over the summer at the University of Michigan working in the lab of Prof. Nicolai Lehnert on some projects involving the interaction between NO (nitric oxide) and Iron chemistry. Drs. Randall, Hayes and Wong, submitted a manuscript to *J. Chem. Educ.* describing the LIBS (laser-induced breakdown spectroscopy) experiment and instruments that Dr. Wong developed at Andrews over the last 10 years based on a grant from the Dreyfus Foundation. A more capable LIBS instrument is a key component in the ChemCam instrument on the Mars Rover, *Curiosity*. Finally, Dr. Randall's research student, Luis Garibay (senior chemistry major), presented some computational chemistry research at the Chemistry Section of the Michigan Academy of Science Arts and Letters.

~ David Randall

Currently, several students are conducting research under the supervision of Dr. Desmond Murray. They are: Andrews Academy senior *Aram Chong* (Synthesis of Group II Metal Oxide Nanoparticles); Andrews Academy senior *Sarah Johnston* (Hydride Initiated Anionic Polymerization);



Academy senior Sarah Johnston

chemistry major *Camille Martin* (Biomass Decarboxylations *via* Metal Oxide Nanoparticles); biochemistry sophomore *Swanika Choy* and biology honor's sophomore *Gifty Barfi* (Dumbcane: Curious Intersection of History, Biology, Physics and Chemistry); medical lab sciences senior *Travis Campbell* (Synthesis and Sensing Properties of Heteroaryl Stilbenes); biology honor's senior *Isaiah Horton* (Synthesis and Sensing Properties of Imino Azachalcones); religion senior *Maureen Raj* (Synthesis and Sensing Properties of Imino Pyridyls); biology junior *Davina Johnson* (Group II Metal Oxides in Organic Synthesis); biology senior *Brittany Wojcik* (Development of New Meerwein-Ponndorf-Verley Reducing Systems); biology senior *Seung Hyun Baik* (Synthesis of Multiphasic Acylal Surfactants).

This summer the following students conducted research with Dr. Murray: biology senior *Rachel O'Reggio* (Synthesis of Bidentate Imine Ligands); University of Michigan biology sophomore *Taylor Glick* (Synthesis of Chelating Bidentate Aryl Aldehydes); engineering major *Luke Kang* (Characterization of Bifunctional Rhodanine Nanoparticle Linkers); University of Michigan Chemistry freshman *Meghan Monaghan* (Synthesis of Chalcone Based Sensors for Iron); and biology senior *Jason Kim* (Synthesis of Hydroxy Benzophenone Stilbenes as Potential Sunscreens).

~ Desmond Murray

Roshelle Hall Joins the Department

This year Roshelle Hall has joined the Berrien County Forensic Lab as the administrative assistant. She replaces Nancy Shepler, who, after seven years of excellent service in our lab, has now taken a full-time position at the James White Library.

Roshelle graduated from La Sierra University in 1989 with a degree in Biology with an emphasis in Zoology. Her love for animals inspired her to attend veterinary school at UC Davis. In 1992 Roshelle realized that God was calling her to work side by side with her husband Ken in his ministry as a pastor.

In 2005, however, their work was cut short by a severe illness which caused Ken to lose the

use of his legs, and to experience tremendous pain and muscle spasms every day. Though they sought help from many doctors—including those at the Mayo Clinic—no one could diagnose the problem.

During this trial, they both were grateful for the many letters and cards they received assuring them that many people around the world were praying for them. Despite the bad news from medical experts, Roshelle and Ken felt the peace of God surrounding them—and on the weekend of Labor Day 2005, Ken heard God speaking clearly to him, “Set aside your walker and walk.” Obeying the command, but fully expecting to land face first into the carpet, Ken was amazed as he started to walk. The pain and nerve damage were gone. There was no medical explanation for this miracle. Of course, the whole family rejoiced, laughed, cried, and praised God together.

The church leaders in Northern California where Ken was pastoring expected him to come in a wheelchair to sign his permanent disability papers, but instead he walked in on his own two feet. Because they had already assigned a new pastor to Ken’s church, he was sent to Andrews to complete his DMin.

Roshelle says that the family loves their Michigan farm—complete with a few birds, goats, and Alpacas. She calls it “Mama Noah’s Farm.” Her husband is now teaching in the seminary, their older son, K.L., has just moved into his own apartment, and their younger son, Josh, is attending Andrews Academy.

Roshelle, Ken, and Josh participated in the Andrews home-coming parade this year as Actinium, Protactinium, and Thorium in our Periodic Parade of the Elements. We are so blessed to have Roshelle and her family as part of our department.

Welcome!



~ John Rorabeck

Continual Improvement of Seminar in Chemistry

As we continue to improve the services offered to our departmental majors, this fall we began requiring all freshmen and sophomores to attend and participate in our weekly seminar program.

CHEM210 (*Current Chemistry Topics*) is our new weekly seminar course required of all freshman and sophomore chemistry and biochemistry majors. Attendance is required each semester during both freshman and sophomore years. So, now all chemistry and biochemistry majors from freshmen to seniors meet each Thursday to attend, participate and listen to guest speakers. An average of about ten invited speakers each semester provides our students with an opportunity unrivalled in most undergraduate chemistry and biochemistry programs. Speakers, live or *via* webinar, expose our students to a broad diversity of topics, applications and fields.

We believe the value and benefits to full engagement by our freshmen and sophomores in our departmental seminars are many including: staying up-to-date, fresh and current; networking with a diversity of professionals; finding paid summer research opportunities; learning that chemistry is truly everywhere; receiving advice on being a successful professional; thinking critically about chemistry; discovering possible professional interests and careers; increasing awareness about the chemistry and biochemistry professions and available resources; evaluating multiple communication skills and styles; and connecting weekly with faculty and fellow majors.

In addition, we continue to open up our seminar program to a wider audience beyond our department majors. This year, so far, we have experienced a significantly higher attendance rate by Andrews Academy Grade 12 students. This resulted from collaboration between the course instructor, Dr. Desmond Murray, and Andrews Academy chemistry teacher, Ms. Carrie Chao.

As part of our seminar experience our department majors are required to write blogs – ChemSemBlog - for the dual purpose of further reflection upon each seminar presentation and communication of technical information in a social media platform. ChemSemBlog can be viewed at <http://www.bestearly.com/chemsemblog>.

We strongly encourage all chemistry and biochemistry alumni to support our seminar program in any way that you can. Specific ways includes giving a seminar/webinar presentation and/or encouraging other professionals to do so. In this regard, we especially thank Dr. Bradley Tait (BS Chem '81) for giving two webinar presentations in our program in the last year. The first was of a technical nature involving the pharmaceutical industry and drug discovery, and the most recent, to our juniors and seniors, was on the job interviewing process.

Do contact course instructor Associate Professor Desmond H Murray (murrayd@andrews.edu; 269-757-1641) with your comments, questions and suggestions. Seminar in Chemistry can be just the vehicle you were looking for to give back to our department and to impact the next generation of Andrews University chemistry and biochemistry students.

~ Desmond Murray

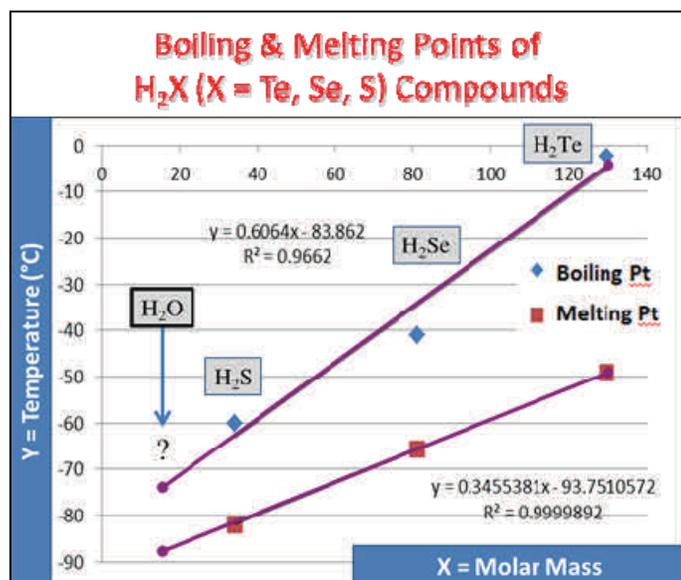
The Real Trend Breaker

Our planet is full of water—the molecule that naturally occurs in all three phases: solid, liquid, and gas. The reason behind this reveals a trend-breaking Creator and Redeemer!

When you study molecules similar to water, an interesting trend emerges. Let us consider replacing oxygen in water with other atoms in the same group in the periodic table, starting with the heaviest tellurium (Te) and working our way up to oxygen. Hydrogen telluride (H_2Te , $\text{MM}=129.6$ g/mol), is a gas at room temperature with a boiling point of -2.2 °C. Hydrogen selenide (H_2Se , $\text{MM} = 81.0$ g/mol) becomes a gas at -41 °C. Hydrogen sulfide (H_2S , $\text{MM}= 34.1$ g/mol) converts to the gaseous phase at -60 °C.

Are you noticing the trend? The lighter the molecule the less energy it takes to boil the molecule. From the trend of these three molecules' boiling points vs. molar mass, one could fit this relationship to a linear equation with a correlation of $r^2=0.966$. We can then predict a boiling point for water (H_2O , $\text{MM}=18.0$ g/mol) to be about -73 °C. Of course, we know water actually has a boiling point of 100 °C, under 1 atmosphere of pressure—over 170 °C away from the trend. Water is a real trend-breaker, doing the unexpected!

Using the same method, we would predict a melting point of -87 °C for ice. Of course, we find ice melting at a balmy 0 °C. The melting point linearity from H_2S through H_2Te is remarkably straight with a correlation of nearly 1 ($R^2=0.9999892$). But, water breaks this trend, due to “hydrogen bonding,” the reason behind the strong intramolecular forces that give water its unusual and trend-breaking behavior relating to boiling point, melting point, density, surface tension, capillary action, osmotic pressure, and many other amazing properties.



What do we learn about our Creator and Redeemer from water, the trend-breaking material? Jesus told the Samaritan woman at the well that He had life-giving water for her. This was the only thing that could end her trend of broken relationships. What was her response to Jesus? We can read it in John 4:28 “The woman left her water jar and

ran back into town.” She dropped HER water. There has been a remarkable trend of sin and death throughout human history, and Jesus broke that trend to set us free and give us eternal life. We need to break our dependence on our own thoughts and ideas, as well as other human efforts, and put God’s word in our hearts and minds. When are we going to stop drinking our own water and start lifting the real trend-breaker to our lips?

~ Ryan Hayes

Pre-Med Advising

Recognizing that our alumni are serving young people in various capacities including college advising and participating in school boards, we want to let you know about a change planned for the content of the medical school admissions test, the MCAT (medical college aptitude test), which is taken between a student’s junior and senior years of college. Specifically, upper division biochemistry will be included in the content of the MCAT in 2015. This will impact those who begin college in 2012 and on. For decades, biochemistry has been a “recommended course” for pre-med students that could be taken in the final year of college.



M-Kitten or M-CAT?

The addition of biochemistry content to the MCAT means that biochemistry needs to be taken by the end of a student’s junior year. Since biochemistry has a pre-requisite of two semesters of organic chemistry, which itself has a pre-requisite of two semesters of general chemistry, pre-medical students who aim to have their summers off should strive to be ready for general chemistry their freshman year of college. Regardless of exactly when a student begins the study of chemistry at the college level, a strong mathematical preparation is necessary for the college level chemistry sequence that students need to complete in order to take the MCAT at the right time. As secondary students plan their academic path toward medicine, they should take as much math as possible.

The Andrews chemistry and biochemistry department remains committed to helping students get the coursework they need in order to prepare for post-college training. For about 10 years, upper-division biochemistry has been part of the chemistry core that all departmental majors take. Of special note, Dr. Nowack, our Biochemistry instructor, taught biochemistry in the summer of 2012 and plans to continue doing so for the near future. While summer courses in lower division chemistry courses are possible to find, it is quite difficult to find a summer biochemistry course. If you have questions or comments, please don’t hesitate to contact the department.

~ David Randall

Alumni News

Courtney Tait (BS, Biochem. '12)

Graduated: May 2012.

Currently: Working on my Master's in Physician Assistant Studies at Union College in Lincoln, NE.

Memories: Dr. Wong's garlic ice cream, Saturdays at the dunes, late night and early morning study sessions, and good times with friends.

Katie Parker (BS, Chem. '11)

I graduated from Andrews with a BS in Chemistry and a BSE in Mechanical Engineering and Mathematical Studies. I will be receiving my MS in Chemical Engineering from Wayne State University in May of 2013. I live in the metro Detroit area. Work and class are both just 30 minutes from home. I work as a process engineer at the family heat treatment business-Specialty Steel Treating, Inc.

Robert Wilson (BS, Chem. '07)

Excerpt from the Journal Era: Congratulations to Robert Lloyd Wilson on the successful defense of doctoral studies in chemistry at the University of Illinois on July 25th, with a dissertation was titled "Applying Secondary Ion Mass Spectrometry to Cellular and Model Membranes to Image Component Distribution and Quantify Composition." Dr. Wilson has accepted an assistant professor position at Pacific Union College in the beautiful Napa Valley. He is the son of Don and Elizabeth Wilson of Dowagiac.

Gillian Phillips (BS, Chem. '88)

Following graduation from Andrews, I completed an MS in chemistry at Notre Dame, a BSN from University of Maryland, and an MSN from University of North Florida for nurse anesthesia. Now I reside in Lake Mary, FL where I practice as a nurse anesthetist with the JLR Medical Group. We are a large anesthesia group, currently serving seven hospitals in the greater Orlando area in addition to several outpatient surgery centers.

That's my update in a nutshell!

Robert Johnston (BS, Chem. '81)

I graduated in 1981, a bumper crop year as far as the Andrews Chemistry Department was concerned. Thanks to great co-op experiences while at Andrews, I joined Dow Chemical in Texas and have worked there ever since, retiring last year after 32 years with the company. The best part of a job in chemical research is that you get paid to learn. The best part of industrial research is that you get to see your ideas implemented and having an impact in the world. It was a privilege to have the opportunity to work in a world class company, learning polymer science and polyolefin technology and applying that knowledge across a family of products involving literally billions of pounds of polymer used in myriad applications.

Since retiring, I have enjoyed catching up on projects around the house, cooking, (I've found that lots of other chemists got their start as I did—cooking!), bicycling on a tandem with my wife Kathy (class of 1980), traveling (in August completing a "bucket list" day hike to the bottom of the Grand Canyon and back), and spending time with family and church friends.

We have had the pleasure of seeing our daughter Laura

graduate from Andrews last year, and our son from Southern Adventist University a couple years before that. With more free time on our hands and family still in the area, we hope to visit Andrews more often and see our old friends as well. I'll always be grateful for the outstanding education I received at Andrews and the opportunities it opened for me.

David Dassenko (BA, Chem. '75)

Memories from an old grad: I helped move all the equipment from the old chemistry building to the new science complex. I also remember assisting Professor Minesinger in setting up the organic chemistry stock room. After leaving Andrews, I received my MD in 1979.

W. Duane Dodd (BA, Chem. '57)

Dr. Halenz and Dr. Blankenship were great, and I enjoyed working as a lab assistant for two years.

I earned a medical degree from University of Illinois in 1962, interned in Decatur, IL, and practiced family medicine in Byron, IL, from 1963-1975, when I moved to Hinsdale and helped Everett Witzel set up the Hinsdale Family Practice Residency Program, serving as associate director and director until 1981.

I returned to private practice in Wyoming from 1981-1984 and then for two years in southern California, after which I worked long hours as the director of Thousand Oaks Urgent Care Center.

Retiring in 1998, we bought a motor home and traveled for over two years, then settled in Collegedale, TN. I've been married 54 years to Elaine Tarr (attended 1953-1956), and we have three adult children, eight grandchildren, and four great grandchildren. We are still active in volunteering with church and community projects.

John Wang (BA, Chem. '56)

I graduated from EMC in 1956, having studied under Dr. Halenz in the old building which was subsequently torn down many years ago. Many happy memories still remain.

After graduation, I went to Loma Linda (then called the College of Medical Evangelists) and received an MD in 1960. Following service with the US Public Health Service and family practice, I completed a residency in radiology at Cook County Hospital. I was a practicing diagnostic radiologist in several states—Ohio, California, and Texas—until late 2007. I am now retired at Loma Linda and have 4 adult children and 10 grandchildren. My oldest daughter is Waylene Wang-Swensen, who graduated from Andrews with a degree in chemistry in 1982.

Max T. Taylor (BA, Chem. '50)

I graduated in 1950, having worked for John Christensen who was a wonderful teacher who taught the pre-nursing chemistry lab. I remember the weekend that they painted the labs with cream-colored lead-based paint. Monday when the labs became active, the walls turned grey from the hydrogen sulfide fumes.

I was named to Who's Who Among Students in American Colleges and Universities, received my MD from Loma Linda University in 1955, the FACS in 1964, and FCCP in 1965. I was alumnus of the year at Andrews in 2012. My specialty is pediatric cardiovascular anesthesia and critical care.

Alumni News

Presently I'm the medical director of the Cardiovascular Care Center at Children's Hospitals and Clinics of Minnesota.

I live with my wife of 38 years, Jean Hermsen Dassenko (class of 1976), in the Minneapolis area. We have two grown children—one of whom majored in chemistry.

Everett Smith (BA, Chem. '49)

I went to Loma Linda after graduating from Andrews, and received my MD in 1953. I interned at Ohio State during 1953 and 1954. For the next 41 years, I practiced general medicine in the Asheville, NC, area. When I retired in 1995, I moved to Tucson, AZ, to be near my daughter and two grandchildren. Then my daughter moved to NC, so we moved back to Asheville, and now live in Winston Salem, NC. Yes—we moved too often!

Best of wishes to all at Andrews and especially the Chemistry Department.

Orris Keiser (BA, Chem. '49)

I actually graduated with a pre-med diploma in 1948, and then with a BA in 1949. I received my MD from Loma Linda in 1953, and had a family practice in Iowa and Wisconsin for 35 years. Then I worked for Holland America Cruise Line as a ship's doctor for 11 years.

I look back at my years working at EMC in the chemistry department with a great deal of fondness. It was a great learning experience and a fun period of my life.

Chet Crawford (BA, Chem. '48)

Dr. Halenz was chairman of the department when I graduated from Andrews in 1948. I had the privilege of working for him during my senior year. He was my favorite teacher. I went on to Loma Linda University the following year to study medicine, graduating with an MD in 1952.

After my internship and two years of service in the Air Force, we moved to Green Bay, WI, where I did family practice for 50 years. We moved to the Denver area five years ago to be near our daughter. All of our children, Bill, Karen, and Mary attended Andrews.

Ursula Whiting (BA, Chem. '47)

I graduated with a BA in chemistry and a minor in English, biology, and history in 1947 and was married that August 26th. I finished a BEd in elementary education from University of Wisconsin in 1955, and in 1969 received my master's degree in guidance. We went to Oshkosh nearly every summer, but would come home to hoe our beans and pickles on the weekends.

At EMC, I worked with Dr. Duane Ford and "Kobby." They are all retired now. I couldn't get a degree in chemistry now, as I'm not knowledgeable in computers or math. I only took what math I had to take in order to get my chemistry degree. I had a lab partner in biochemistry who was Japanese. His father and brother, who were both pharmacists, were killed when we dropped the bomb, but he said since I wasn't responsible for their deaths, he still liked me. I was thankful he was my partner. He would set up the equations for me.

I loved EMC, but it was different then; when I first arrived there were 100 boys and 500 girls. When I graduated there

were 500 of each. I had to take 5 semesters of German. I was glad the last semester was scientific—as I knew all the experiments before I had to translate them. Since I was the only student, I met with Mrs. More in her office. I pulled a B that semester in German. In my master's studies we had to get at least a B or the class wouldn't count!

I taught at Lena high schools and elementary schools and was the guidance counselor of 12 years. Our oldest son has taught at Lakeshore Technical College for 23 years. He had said he'd never be a teacher because all we did every evening was check papers. My husband was a teacher too. He had diabetes and so did his brothers and sister. I took care of him until he went to a nursing home in Oconto, where I could visit him every day. He passed away in 2005, at 84.

I have lived in my home since 1950 and still drive around here. I've never had an accident in more than 62 years of driving. My father helped us fix this place up and my uncle Raymond Metzger did the downstairs. Our son Wayne was born 4 years after we married, and then in 1956 we had Lon. A year later Ric arrived, and 5 years after that we had twin girls. I thank God for them. My family checks on me every day, as I have osteoarthritis and skin cancer—I couldn't live out in the country without their help! After church I have 5 to 20 people over for Sabbath dinner. Even though my grandchildren don't come to church, they come for dinner.

Until I was 82, I ran a mile daily. I fell, but God has been very good to me and no bones were broken. I've outlived many of my cousins, but I know I'll see them again when Jesus comes.

Chem Minors Alumni News

Leilani Bermeo (BS, Nutr. Sci. '04)

Although I wasn't a chemistry major, I wanted to update the department on my current activities. My hometown is still Berrien Springs, and I work at Lakeland Rehabilitation Services in Niles as a Physical Therapist—having earned my Doctor of Physical Therapy from Andrews in August of 2008. I enjoy reading the Molecular Sieve each year.



Our Human Periodic Table of the Elements won first place in the Andrews University Homecoming Parade of 2012. Here the ChemClub officers display the trophy and prize money.

From left to right: Vice-president Camille Martin, Public Relations Officer Satoshi Thiele, Pastor Jordan Holzschuher, Secretary Betsy Quetz, Treasurer Rosanne Thornhill, and President Joshua Szykowski with sponsor Dr. Hayes.

Spring 2012 Graduates and Awards

Spring 2012 Undergraduate Degrees Awarded

Brittany Foster, BS Biochemistry
Adam Shull,** BS Chemistry*‡
BSE Engineering, (Mechanical)*
Courtney Tait, BS Biochemistry*

*Summa Cum Laude

‡Completed requirements for ACS certificate

** JN Andrews Honors Scholar

Spring 2012 Awards

ACS General Chemistry Award Michelle Imperio
ACS Analytical Chemistry Award Jonathan Lee
ACS Organic Chemistry Award Andre Moncrieff

Spring 2012 Scholarships

Lois K. Mutch Scholarship Satoshi Thiele
R. Scorpio Scholarship Jordan Holzschuher
Tait Family Scholarship Esther Onwong'A
Dwain Ford Scholarship Rosanne Thornhill
Halenz Scholarship Jonathan Lee
Richard Cook Scholarship Luis Garibay
Richard Minesinger Scholarship Mark Bateman
Mutch, Scorpio, Wilkins Award Soon Ho Park
Robert Wilkins Scholarship Stephen Gilbert
Chai Hee Wong Scholarship Samantha Chang

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Chem Alumni CONTACT

Please update information about yourself. We look forward to hearing from you.

Name _____

Address _____

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City _____ State _____ Zip Code _____

Degrees Received:

At Andrews _____
Degree _____ Year _____

Other: _____
Degree _____ Year _____

News about yourself & your family:

E-mail notes to chemistry@andrews.edu.

We would love to receive **pictures** too.

Becoming a Chemistry Partner:

Yes, I would like to help the Department of Chemistry and Biochemistry achieve its goals by making a contribution.

Please use my gift of \$_____ for:

- General contribution in area of greatest need
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- Named scholarships
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YOUR NAME (as you wish it to appear in the next issue of "The Molecular Sieve", or "Anonymous" if you don't want your name used in connection with this gift.)

Will your employer match funds?

- Yes (if so, please include with this form the matching gift form from your personnel office.)
- No
- Don't know

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

New Gas Chromatograph-Mass Spectrometer

The faculty are excited about a new GC-MS instrument the university has purchased (with some departmental support) as part of the administration's commitment to further developing the STEM (Science, Technology, Engineering, and Mathematics) educational offerings for students—particularly in chemistry.

As you probably know, GC-MS is an important analytical tool for chemists because it combines chromatography, the ability to separate substances in a mixture, with a molecular identification technique, mass spectrometry. The instrument allows our students to build on the department's tradition of hands-on learning. In the past, Drs. Ford, Alonso, and Mutch have labored heroically to make functional the GC-MS instruments that have been donated by various companies. A mass spectrometer is a sufficiently complex instrument, that this proved to be a very difficult task on an ongoing basis.

A truly impressive array of mass spectrometry techniques have been developed in recent years—including DART (Direct Analysis in Real Time) instruments that have the ability to detect limonene (a terpene in citrus fruit) when an instrument's probe is simply placed over (not in) a glass of orange juice. Given the broad applicability of mass spectrometry, instruments with higher-end applications (like the orange juice sniffer) have higher-end price tags that can exceed a million dollars. The department chose to pursue a much more reasonably priced single quadrupole instrument from Agilent because the faculty felt it provided a sensible balance between giving students the experience they need and the necessity to safeguard departmental monetary resources.

Dr. Ahlberg, who is teaching organic chemistry, has been waiting for the instrument to be set up so that organic chemistry students could determine what mixture of compounds was formed in an organic chemistry lab. The instrument will also be used in our instrumental analysis lab. Faculty research projects by Drs. Ahlberg, Murray, and Nowack will also make use of our new GC-MS.



Dr. Randall with the new Agilent Gas Chromatograph-Mass Spectrometer

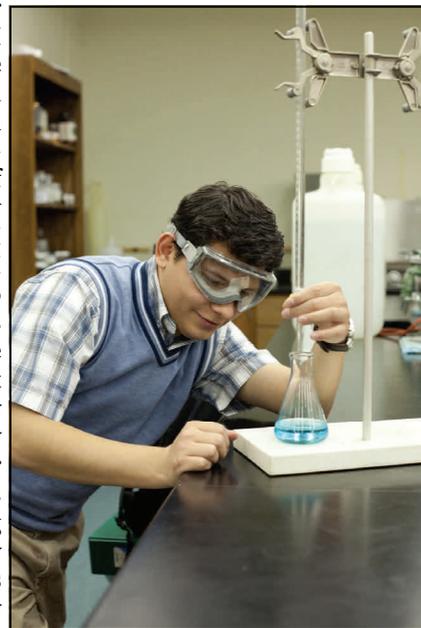
As the instrument was being installed, it was rewarding to see the genuine interest and excitement from students. We look forward to developing experiments for our students that will highlight this fine instrument.

~ David Randall

REU—Research Experience for Undergraduates

It seems like yesterday when I began my studies at the Department of Chemistry and Biochemistry here at Andrews University. Now, after almost four years, I look back to those days in which I would sit in my freshmen chemistry class—completely unaware of the amazing journey ahead of me—and I realize how much I have grown thanks to all my experiences during college. One particular element that has greatly contribute in my preparation for graduate school is research; and along with the many opportunities available at our very own department,

Research Experiences for Undergraduates (REU) programs have given me the opportunity to put into practice the many skills learned in the classroom while allowing me to meet other scientists and get paid for my efforts.



This year, for the second time, I had the opportunity to participate in a research summer experience—this time at the University of Illinois at Urbana-Champaign. Under the supervision of Professor Prashant K. Jain and the mentorship of Mr. Aaron Routzahn, I spent 10 weeks of my summer in hot central Illinois determining the experimental conditions that would allow further real-time measurements of the chemical, morphological and optical properties of cadmium selenide quantum dots and explore their relation to the dots' photocatalytic activity in redox reactions. In addition, the program allowed me to learn more about the application process to graduate school and to further develop my scientific communication skills through the writing of research proposals and poster preparation. It was a positive experience that ended successfully as I was able to accomplish my goal and earn the appreciation of the UIUC faculty members.

Signing up for a summer research experience is something that I would very much recommend to all undergraduate students because it will enrich their careers and make them very appealing to graduate and professional schools.

In closure, I would like to thank all the faculty of the Chemistry and Biochemistry Department because with patience and love they have provided me with the skills that have opened the doors for summer research and the tools to become a successful chemist. And while the journey has not been easy or fun all the time, I am serious when I say that I would change none of it.

~ Luis Garibay



Message from the Chair

D. David Nowack, PhD

The faculty and staff of the Department of Chemistry and Biochemistry send their warmest greetings to you and yours in this Fall season of 2012. Our Lord and Savior have bestowed many blessings on us in the year since our last Molecular Sieve issue. Among those blessings is the addition to our Department of Cadance Marie Hayes in July 2012. (See Mother and Baby picture below.) Ryan and Suzi Hayes are the proud parents. Ryan joined the Department in the Fall of 2008.



Suzi Hayes with little Cadance

Curriculum

As mentioned in other places in this issue of the Molecular Sieve, we have added a required seminar for the first and second year chemists and biochemists. The student response to this added requirement is positive. Not all topics of the guest speakers appeal to each student, but the wide variety of subjects means that eventually, the student will discover a topic that interests them. The students to whom I have spoken expressed enthusiasm for the overall experience. Personally, it is a lot of fun to see and hear about the cutting edge of chemistry.

Instrumentation

Andrews University continues to invest in the Chemistry Department by increasing our cluster of advanced instrumentation. The acquisition of the Agilent GC/MS described in an article in this issue is the latest example of such investment. Our overall program continues to strengthen with addition of such modern instrumentation.

Future acquisitions are already in the works for next year with the purchase of an "atomic identification" instrument to replace the worn out AA spectrophotometer. Alumni donations play a vital role in supporting the purchase of the instruments as well.

Facebook

Yes, the Department of Chemistry and Biochemistry is on Facebook! Point your URL to: <http://www.facebook.com/pages/Andrews-University-Department-of-Chemistry-and-Biochemistry/>. The page highlights the many activities of the department. Dr. Murray posts the latest Chemistry Seminar speakers who are truly some of the outstanding chemists in the Great Lakes area. There are pictures of social activities like the Alumni Parade and Mole Day. Join us, friend us, like us. You'll be glad you did.

Students

Our students continue to make us proud. Camille Martin participated in a Department of Engineering-sponsored visit to the Annual Meeting of the Society of Women Engineers in Huston, Texas. Camille had a wonderful time. She wrote, "The experience confirmed my career interest and was the push I needed in order to finish this semester strong."



Camille Martin, senior biochemistry major

Fundraising

Alumni of the Department Chemistry and Biochemistry continue to support their department in a substantial way. In addition to the support two summers ago for the renovation of the Chemistry stockrooms, alumni currently provide funds that allow the Department to purchase, in part, the latest instrument in our department, the **Agilent Gas Chromatograph with a Mass Spectrometer detector**. (This instrument is described in another article in this issue.) In the very near future, funds from alumni will be used to purchase, in part, two new **student-grade FT-IRs** as well as supporting the renovation of the **Chemistry Amphitheater**. The students and faculty are grateful for this vital support. The impact of these funds, which are used responsibly and frugally, effects the quality of the student experience in a very positive way. Thank you!

In closing, I wish each of you God's richest blessings of health and happiness for the year to come. The faculty and staff are grateful to be a part of the education of the next generation of chemists and biochemists. Stop by anytime to enjoy a tour of the department. We will be glad to see you!

All The Best!

~ D. David Nowack, Chair