

# Periodic Trends

Issue 04  
October  
2018

## Old Dominion University ~ Department of Chemistry & Biochemistry

Hello Alumni, Students, Faculty, and Friends! I hope you had a great summer and are ready for the crisp fall days ahead. The Chemistry & Biochemistry Department certainly had a busy and action-packed summer which has transitioned into a great start to the fall semester. The department had two exciting programs this summer, a study abroad in Jamaica course and our first REU Experience. You will be able to see many of the highlights of both programs in this issue of *Periodic Trends*. There is also a research spotlight on Dr. Alvin Holder's research group and highlights from some faculty achievements. There are two spotlights in our Alumni News, featuring Ernest Maranan and Dane Hartman. It is always wonderful to see what our alumni are doing now, so we would love it if you would reach out to us and share your story. The planning of the new 110,000 square foot Chemistry Building, which will overlook Elkhorn Drive and the Baseball Field, is almost complete, and we anticipate breaking ground February 2019. The department is also excited to have four new Ph.D. students and a new M.S. student join us this fall. You will find more information about these students on page six and seven. This semester we also had our inaugural Department Picnic! The picnic was a great success with over 100 graduate students, faculty, undergraduate research students, and special guests attending. Not only did we have great food fresh off the grill, the picnic provided a relaxed atmosphere for fellowship. In the photo I am visiting with Leila Hesami, a new Ph.D. student, Dr. Kurnia Foe and his wife, with the Global Student Friendship Organization, and Mahdi Yousefi, a Ph.D. student in Dr. Bernath's group – more pictures inside the newsletter. We hope to make this an annual event and our alumni are always welcome!

Sincerely,  
John Cooper, Chair



# Current Grant Funding

<b>Principal Investigator</b>	<b>Research Project</b>	<b>Available Budget</b>
C. Bayse	NIH Molecular Modeling of the Activity and Inhibition	\$252,475.08
C. Bayse	REU Site: Undergraduate Research Opportunities In Chemistry	\$215,268.47
C. Bayse	Virginia Academy of Science Award	\$3,000.00
P. Bernath	NASA Spectroscopy For Super-Earth Atmospheres	\$109,898.08
P. Bernath	NASA Absorption Cross Sections for the Outer Planets	\$155,597.98
P. Bernath	Spectroscopy of Astro Molecules	\$67,098.47
J. Donat	Quarterly Water Testing Services	\$1,104.00
J. Donat	CBP WQM FY18	\$22,951.72
J. Donat	CBP WQM FY19	\$307,725.21
L. Greene	Exploratory Look Into the Future: Investigation Adaptation	\$677.84
P. Hatcher	NSF Collaborative Research	\$51,677.90
P. Hatcher	Characterization of Natural Organic Matter by Advanced Analytical	\$24,928.24
P. Hatcher	Addomex 2: Towards Synthesis of Processes & Pathways of MARII	\$59,527.91
P. Hatcher	Biogeochemistry of Phosphate and Carbon Interactions in Argo	\$145,017.17
A. Holder	NSF Metal Comp and Photo Water	\$38,055.88
A. Holder	MARC Undergraduate Student Training in Academic Research PR	\$115,469.69
A. Holder	Cashmatch: MARC Undergraduate Student Training	\$31,852.00
J. Lee	USDA Designer Algae Biotechnology Risk Assessment	\$132,991.10
J. Lee	Cashmatch: Designer Algae Biotechnology Risk Assessment	\$19,360.04
J. Mao	Collaborative Research: Air-Oxidation of Biomass Chars	\$53,021.36
K. Mopper	Cynate in the Sea	\$11,989.81
K. Mopper	Cynate in the Sea—Rui Wang	\$1,233.18
J. Poutsma	Intrinsic Gas-Phase Properties of Peptides	\$40,000.00
J. Poutsma	William and Mary Fragmentation Mech	\$1,164.38
E. Purcell	NIH Role of Stringent Response	\$13,260.34
G. Wang	Synthesis and Study of Glycoconjugates and Carbohydrates	\$410,960.85
G. Wang	Hybrid Organic-Inorganic Materials OFR Non-Volatile	\$4,908.60
N. Xu	NSF Brain Eager: New Tools For	\$82,376.33
N. Xu	NSF New Tools for Real Time	\$20,739.70
N. Xu	NSF New Tools for Real Time	\$2,430.89
N. Xu	Photostable Multiplexing Nanoassays for Real Time	\$238,935.69
N. Xu	NIH New Phtostable Nanoprobes	\$246,602.55
N. Xu	Research Supplement To Promote Diversity	\$69,378.57
<b>Total:</b>		<b>\$2,951,680.01</b>

# Research Spotlight ~ Dr. Alvin Holder

Alvin A. Holder, a country boy, was born and raised in the [Island in the Sun, Barbados](#), at Foster Hall in the eastern parish of St. John. An interesting fact noted by Dr. Holder: [Green monkeys](#) that were brought to the Caribbean during the days of slavery are on the island of Barbados.

He was a student of the oldest [West Indies](#) secondary school (1721), The Lodge School, Barbados. He then attended [The University of the West Indies \(UWI\), Cave Hill Campus, Barbados](#), before he transferred to [The University of the West Indies, Mona Campus](#), Jamaica, where he earned a Special Chemistry Degree. He pursued his graduate career with Professor Tara P. Dasgupta, and acquired a Ph.D. degree in inorganic chemistry.



Dr. Holder joined the Department of Chemistry & Biochemistry as an Associate Professor in 2013. Previously he was an Assistant Professor in Chemistry at The University of Southern Mississippi (USM) from 2006-2013. He was also faculty member at UWI - Cave Hill Campus from 1994-2003. He was a postdoctoral fellow at ExxonMobil Research and Engineering Company, Virginia Tech, The Ohio State University, and Colorado State University. He has published more than 70 articles, two textbooks, and five book chapters; directed three postdoctoral fellows, and directed six graduate students at USM and U.W.I. His current research revolves around transition metal chemistry, which is (and has been) funded by the National Science Foundation, The Department of the Army, MS INBRE, American Chemical Society, ExxonMobil, and USM.



# Research Spotlight ~ Dr. Alvin Holder

Dr. Holder is passionate about research involving transition metal chemistry (biomedical research and renewable energy) and mentoring both grad and undergrad students. As he says, "It is all about family first!" Ph.D. student Michael Celestine, joined Dr. Holder's research group in the Fall of 2013. Michael is from the Virgin Islands. Raj Gurung joined the group a year later as a Ph.D. student. Raj is from Nepal, as are five other current grad students in our program. Dr. Holder's research group logo: When we do "GOOD" chemistry, we do "IRIE" chemistry! Their mottos are : *Possunt quia posse videntur* [The Lodge School, Barbados], and "teaching students how to do research and researching how to teach students" [Declan De Paor, R.I.P.].

Part of his mentoring led to funding from the National Institutes of Health for funding entitled "Maximizing Access to Research Careers (MARC) Undergraduate Student Training in Academic Research Program at ODU" with him as the PI. The funding is worth \$1.5 million, with institutional support from ODU. You can check out the story on Wavy 10: <https://www.wavy.com/news/local-news/norfolk/odu-receives-millions-in-grant-money-to-help-minority-students-pursue-stem-education/1294417746>).

The article in the Pilot can be found at: [https://pilotonline.com/news/local/education/higher-education/article\\_1e55fd4e-810c-11e8-97b3-7b59fd34faa0.html](https://pilotonline.com/news/local/education/higher-education/article_1e55fd4e-810c-11e8-97b3-7b59fd34faa0.html)



Michael Celestine is preparing a sample to acquire its cyclic voltammogram for the characterization of his complex via its observed oxidation and reduction potentials. The complexes that Michael is working on will be used for the generation of hydrogen in acidified media when exposed to sunlight.



Raj Gurung pictured left. Holder's lab is one of the synthetic labs in the department, and one of the projects is to synthesize novel titanium(IV) salen complexes.

After successful synthesis, these complexes will be tested for their liquid crystal properties. The salen compound was obtained by refluxing aldehyde and amine compound. After refluxing, the solvent was removed using a rotary evaporator.

## Dean's Fellow for Outreach College of Sciences – Dr. Pinky McCoy



The Dean's Fellow for Outreach will be appointed to an initial term of one year and be responsible for assisting the Dean with outreach activities in the College of Sciences. The Dean's Fellow for Outreach will receive a stipend of one month of salary per year.

Specifically, the Dean's Fellow responsibilities include:

1. Organize the First Friday events (new for College of Sciences). Prospective students visit campus and tour research laboratories on the first Friday of each month. Engineering has been doing this for a while with great results. The Dean's Fellow will be the point of contact in the Dean's office and interface with the Admissions office, Engineering, and faculty.
2. Assist with the recruitment and management of the College's Student Ambassadors.
3. Assist with Open House events (approximately 3 per semester).
4. Review the College's promotional materials and coordinate the development of new or updated materials.
5. Organize visits by local International Baccalaureate (IB) students (new).

## Dean's Fellow for Undergraduate Research College of Sciences – Dr. Craig Bayse

The Dean's Fellow for Undergraduate Research will be appointed to an initial term of one year and be responsible for assisting the Dean with all aspects of undergraduate research in the College of Sciences. The Dean's Fellow for Undergraduate Research will receive a stipend of one month of salary per year. Specifically, the Dean's Fellow responsibilities include:

1. Create and maintain an inventory of all undergraduate research experiences ongoing in each department.
2. Coordinate and support undergraduate research, including providing assistance from the Dean's office as needed.
3. Form and chair a College-wide committee, with representation by faculty from all departments, to develop goals and objectives for the College's undergraduate research program.
4. Recruit faculty to participate in undergraduate research as mentors and provide training for faculty mentors.
5. Publicize undergraduate research opportunities to students.
6. Publicize the undergraduate research program to the larger University and act as the point of contact for all inquiries concerning undergraduate research.
7. Assist in coordinating support requests to the Dean's office.



# New Graduate Students ~ Fall 2018

## **Ph.D. Student: Leila Hesami**

Hometown: Sirjan, Iran

Education: M.S. Chemistry,  
Yazd University

Interest: Inorganic or Organic



## **Ph.D. Student: Adenrele Oludiran**

Hometown: Isolo, Lagos State, Nigeria

Education: M.S. Chemistry,  
Old Dominion University

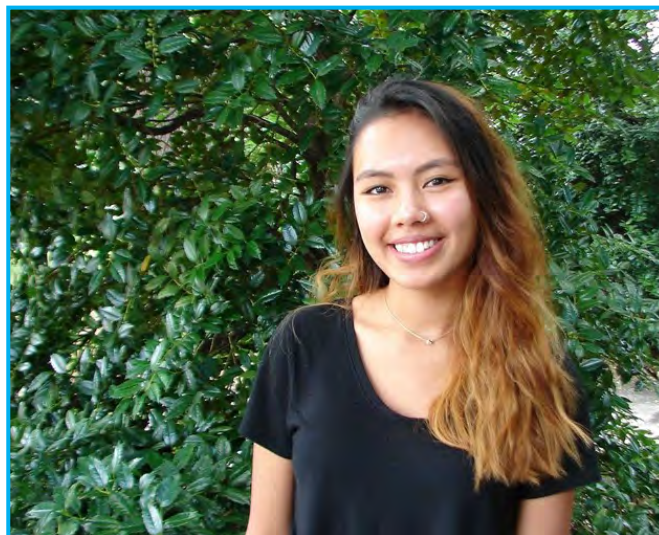
Interest: Biochemistry & Biomolecules

## **Ph.D. Student: Criszcele Tano**

Hometown: Originally from Guam, but  
has lived in Virginia most of her life

Education: B.S Chemistry,  
Old Dominion University

Interest: Inorganic



# New Graduate Students ~ Fall 2018

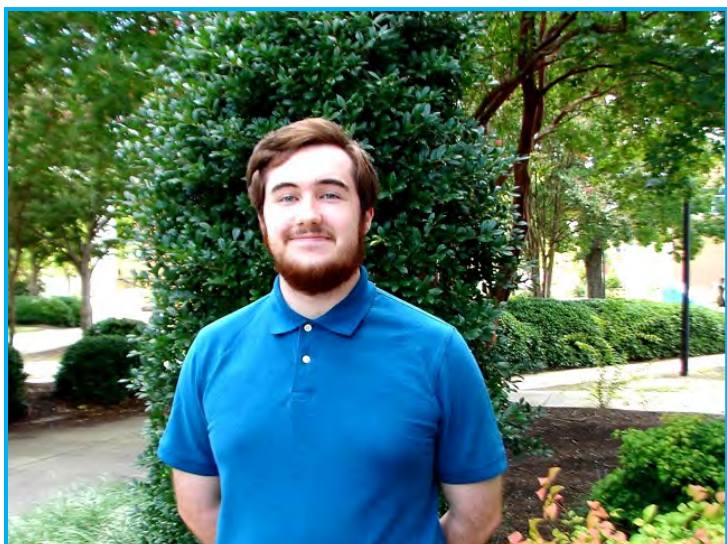


**Ph.D. Student: Elizabeth Tonsel-  
White**

Hometown: Chesapeake, VA

Education: B.S. Interdisciplinary Science &  
Chemistry,  
Virginia Commonwealth Univ.

Interest: Analytical & Organic



**M.S. Student: Daniel Desjardins**

Hometown: Hampton, VA

Education: B.S. Chemistry,  
Christopher Newport University

Interest: Organic

# Summer in Jamaica

**Bioinorganic and Natural Products Chemistry**  
**CHEM 411/511; 4 or 5 credits ; Dr. Alvin Holder**

**May 9-27, 2018**

This study abroad course provides students the opportunity to live and learn in Jamaica. The course introduces students to medicinal plants indigenous to Jamaica. Lectures, reading, and discussions focus on the chemistry of vanadium, medicinal uses of vanadium for the fight against diabetes, and literature as it relates to uptake of vanadium(V) by *Ascidia nigra* tunicates. Hands-on activities in the laboratory and field trips emphasize identification, methods of collection and preservation, extraction and characterization, and testing the environments where these natural organisms proliferate. The laboratory work takes place at the University of the West Indies' Mona Campus, Kingston. Applications for utilizing "natural products" from Jamaica and the Caribbean are also explored. Students will also interact with locals when they participate in a one day service project on Labor Day, a Jamaican national holiday.





# Summer in Jamaica



Students looking for medicinal plants near One Love Falls, Ocho Rios.



Students snorkeling for tunicates. A tunicate is a marine invertebrate animal, a member of the subphylum Tunicata, which is part of the Chordata, a phylum which include all animals with dorsal nerve cords and notochords. The subphylum was at one time called Urochordata, and the term urochordates is still some used for these animals.

# Summer in Jamaica



Students being lectured on tissue culture by Mr. Ryan Francis at the Scientific Research Council.



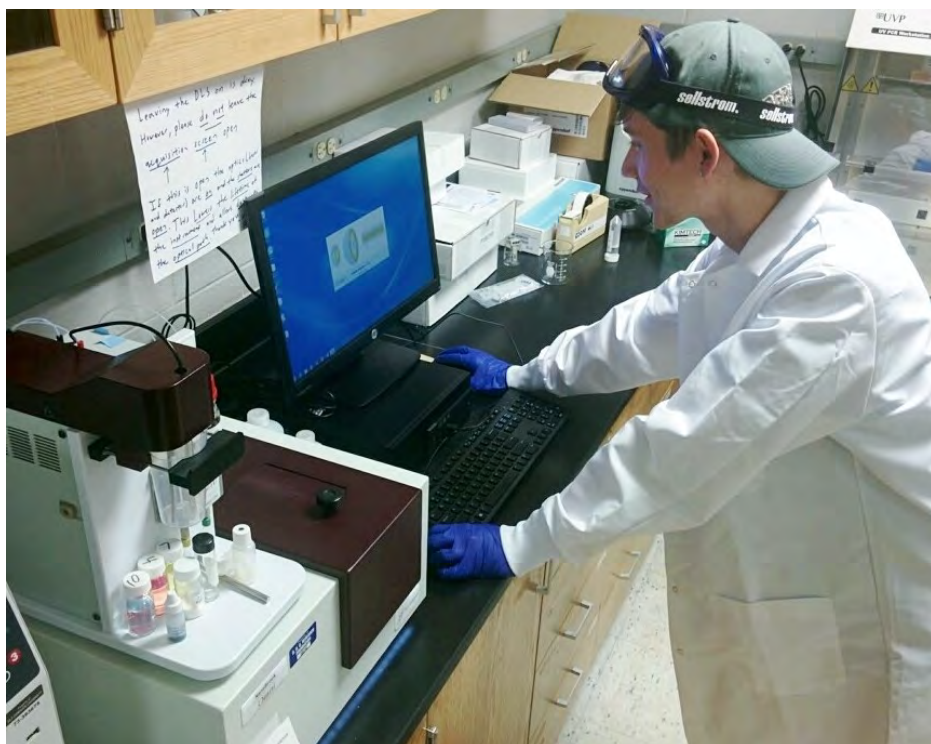
Students looking for marine sponges at Port Royal with Dr. Winklet Gallimore of U.W.I.

# REU for Community College Students

This summer, the department hosted its first Research Experiences for Undergraduates (REU) site. Dr. Bayse and Dr. Holder secured the grant to bring community college students to ODU to work with faculty mentors over ten weeks. The grant's purpose is to give first-generation college students, veterans, and others from groups underrepresented in the sciences a taste of life as a scientist in hopes that they transfer to a four-year college and continue to a STEM career. Several participants have already made the leap to ODU and VCU to major in chemistry, chemical engineering and physical therapy!

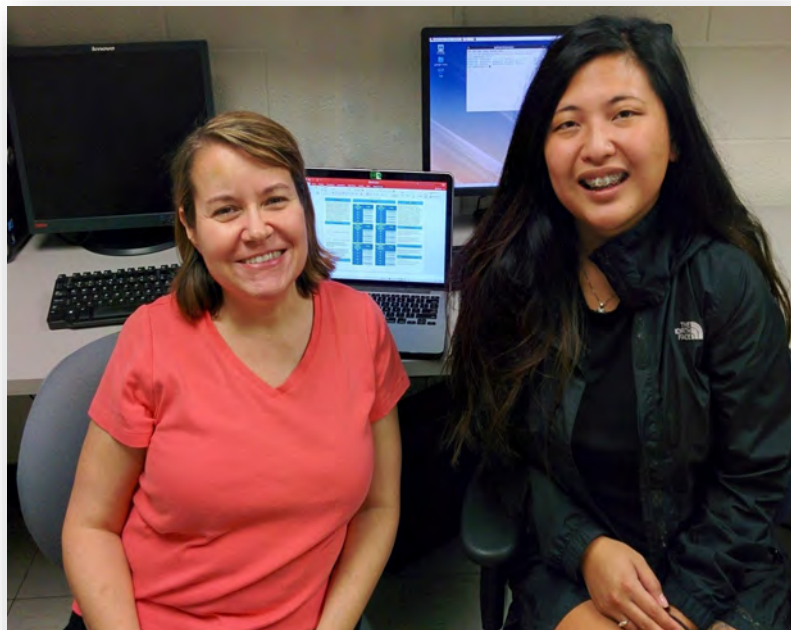
Students from community colleges in Virginia and California arrived Memorial Day to start work in ten different faculty labs. Half of the participants joined the program through our partnerships with Tidewater and Thomas Nelson Community College. Participants bulked up their resumés with some serious lab skills along with making new friends and navigated the challenges of dorm life. Over the coming months many will see their names as co-authors on papers and get a chance to travel to conferences to present what they learned.

Congratulations to the REU students on their accomplishments over the summer and a big 'thank you' to the faculty and graduate students that made the program a success!



REU student, **Tyler Walters** (Thomas Nelson Community College), performing dynamic light scattering analysis of his engineered nanocapsules. Tyler worked in Dr. Bala Ramjee's research group.

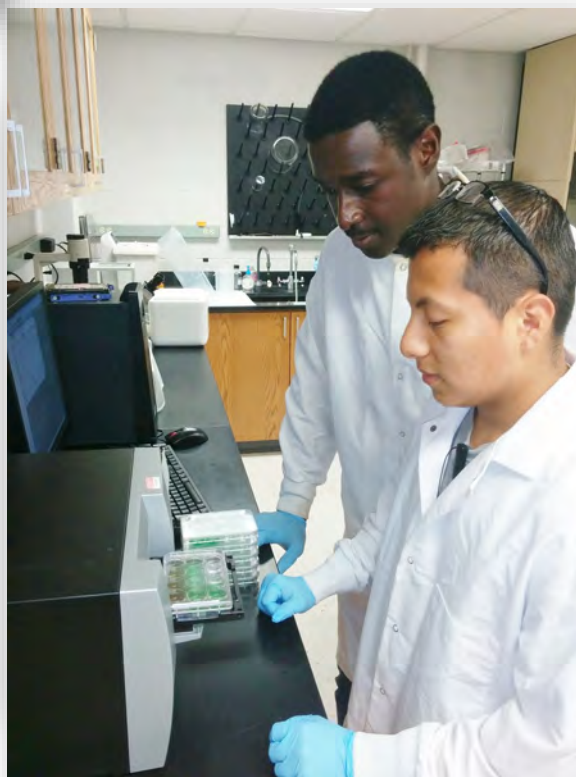
# REU for Community College Students



Left: Dr. Jennifer Poutsma (left), computational chemist, with her REU student, **Jalina Gallagher** (Tidewater Community College). Jalina is working on conformational searches of lysine analogue tripeptides. Eventually, she will calculate pathways for hydrogen/deuterium exchange.



Above: **James Dawe** (Colorado Mesa University) NSF-funded REU project student working in Dr. James Lee's research lab. James is preparing samples for dissolved organic carbon (DOC) analysis.

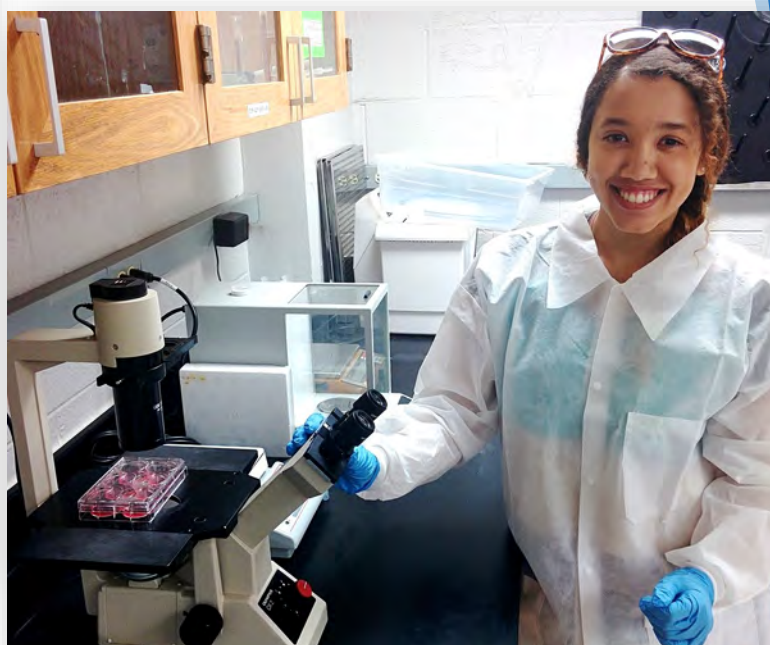


**Jorge Morales** (front) REU student and Oumar Sacko, PhD Student in Dr. James Lee's research lab, measuring absorbance on bioassay plates to test the effect of biochar filtrates on cyanobacteria.

# REU for Community College Students



**Michael McKinstry** (Sacramento City College), an REU student in Dr. Jingdong Mao's group, is measuring a black tea thearubigin sample using  $^{13}\text{C}$  solid-state NMR.



**Malia Stuart** (Palomar College), an REU student that worked with Dr. David Courson is checking the growth of her mammalian tissue culture cells that she modified using CRISPR-Cas9.



**Cole Pate** (Virginia Wesleyan Community College), a REU participant in Dr. Pat Hatcher's group, is sealing ampoule vials to conduct acid oxidation of coal samples for black carbon analysis.

# REU for Community College Students



Jonathan Bietsch, PhD student in Dr. Guijun Wang's research group, overseeing **Mary Aolson**, an REU student from Tidewater Community College. Mary is learning how to purify compounds via column chromatography. "Separation Anxiety" (chromatography joke from Jonathan Bietsch).

**Mohammed Jaffar** and **Esperanza Garay**, REU participants in the Chemistry and Clean Fuels REU, work on creating molecules as part of their summer research projects in Dr. Craig Bayse's computational chemistry research group.



# REU for Community College Students



**Estevan Coronado**  
(Sacramento City College)  
setting up PCR reaction, in Dr. Erin Purcell's research lab, to amplify promoters from the *Clostridium difficile* genome. These promoters control the expression of *C. difficile* genes. The Purcell lab is investigating the roles these genes play in *C. difficile* antibiotic resistance.

Gyan Kharel, a PhD student in Dr. James Lee's research group, instructs REU student, **Ryan Gunter** (Trevecca Nazarene University), in the use of the Alpha FTIR for the analysis of biochar samples.



# Alumni News

**Ernest Maranan**

## **Double Major Chemistry & Biochemistry 2012**

I'm currently working as a Product Development Engineer for Earthcore Industries. Earthcore Industries is a manufacturing company that produces fireplace and chimney products out of ultra-lightweight concrete made from volcanic pumice. The porosity of the pumice allows us to create concrete blocks that could withstand 2500°F heat with very little heat transfer. In addition to concrete, we are also in the process of developing new and innovative linear burners and cool touch glass fireplace doors to improve home efficiency and meet the environmental standards of today's increasingly stricter building codes. My role is to design, fabricate, and test new products to UL and ANSI standards. One of the testing requirements is to measure the combustion emissions from gas log fireplace burners using NDIR spectroscopy and ensure that concentrations are within industry standards. I also occasionally travel to different parts of the country to collaborate with other companies' engineering departments for joint projects and business meetings where we discuss cost-benefit analysis and market research analysis.

Prior to working for Earthcore, I was a Chemist for the City of Norfolk Water Quality Laboratory where I did daily bacteriological and inorganic wet chemistry test on drinking water. One of my main tasks when I worked for the City of Norfolk was to use an ion-selective electrode to determine fluoride concentrations in drinking water and make sure the concentrations were well below State of VA and EPA regulations. Another task was to use flow injection analysis (FIA) to monitor nitrate and nitrite levels in the city reservoir located in Suffolk, VA. Excess levels of nitrate could trigger harmful algae bloom that could release microcystins into the reservoir which pose a major concern to water treatment facilities throughout the country. Luckily, nothing like that has ever happened in Norfolk or Virginia Beach. I left the City of Norfolk laboratory because I was offered a position by Earthcore Industries where the focus is in the research and development field and away from the analytical laboratory setting.

I initially went to ODU with the mindset of going to pharmacy school once I graduated. That changed when I became fascinated by Dr. Brown's physical chemistry class. Even though the material was difficult to learn I thoroughly enjoyed Dr. Brown's lectures and labs. As I took more upper level chemistry courses I realized I had a passion for chemistry laboratory setting and pharmacy school was a distant memory. I became a member of ODU's student chapter of American Chemical Society where I participated in community outreach activities like Scout Day. ODU's chemistry program gave me the knowledge and discipline to succeed in the real world. My wife and I recently purchased a new home in Virginia Beach where we plan to raise our 4 kids until we retire. I'm grateful for the opportunities my chemistry degree has provided me and my family.





# Alumni News

**Dane Hartman**

## **Major Chemistry 2012**

During my years at Old Dominion University the chemistry department was hands down the best program I took part in. With my advisors I never had to question the path I needed to take to graduate or what was next in line with regards to course and curriculum.

The professors and teaching assistants were easy to approach and very knowledgeable. I was never turned down when I needed help, assistance, or even just a quick review on information covered in class. The teaching assistants who ran the lab sessions were accommodating and often available for time after hours if needed.

As my organic teacher and lab instructor, Dr. Jennifer Poutsma, found a way to make organic chemistry make sense and fun in the lab. Her teaching methods were initially confusing and different than traditional lectures, but it turns out that it made the material easier to digest and learn. Organic went from the topic that scared me to something that I now use in my daily life at work. She was always available for discussion and I even assisted her with part time undergraduate research for a few years.



Dr. Janet Moloney – soft spoken but confident. Firm but kind. She made my organic lab course enjoyable. She was never critical of mistakes and helped students to understand what was going on rather than just criticize improper techniques or methods. With intelligence and grace, she made lab work effortless and enjoyable. Sometimes being an instructor goes beyond the actual course work. I was visibly stressed in the common area studying for finals my senior year when she stopped by to ask how things were going. I told her if I didn't nail this exam I wouldn't be graduating and the next thing I know she offers to buy me something from Starbucks and tells me to take a break and relax before going back to study. Sometimes it is the little things that get you through the low points and in this case it was someone who clearly cared about her students and their well-being.

Dr. John Donat was the most challenging professor in my chemistry major. Never a dull moment in lecture, his enthusiasm and outspoken attitude made the course work bearable and every explanation provided was thorough and in-depth. His lab course was equally challenging and helped hone some critical techniques and methods still used today. His insight into analytical methods have made the difference in projects I have completed and problems that have appeared in my line of work. I wouldn't be the chemist I am today if it weren't the teachings in analytical chemistry I received from Dr. Donat.

Currently I am a formulation chemist working research and development at a coating company. I am responsible for researching different chemistries and developing different products at the request of the customer base. The work has included polyurethane, epoxy, acrylic, polyurea, cement, and various other polymeric systems. Each project is a balance of testing different mixtures to achieve different physical and chemical properties.

My future plans are to continue working in industry. Research and development is rewarding, both mentally and fiscally, but I don't want to limit myself to any one product line or type of chemistry. Formulators need to look beyond the chemistry to make innovative and new products work in the market. I feel learning as many types of chemistry and systems as I can now will benefit me when I am ready to take on the roles of a technical director. Ultimately I strive to be responsible for a team of chemists and formulators working to develop product for the next generation of applied materials science, whether that be coatings or any other type of applied chemistry.

# A.C.S. Student Chapter News

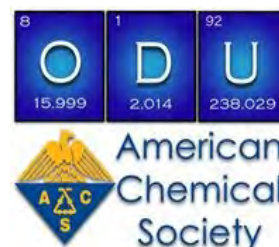


(back row – left to right) Chris DeVries - President; Heather Sheffley – Treasurer; Dr. Bala Ramjee – ACS Faculty Advisor

(front row – left to right) Delvin Askew – Secretary; Kyla Carr - Demo Officer; Laura Sweet – Historian; Trey Halsey - Vice President

As ODU's student chapter of the American Chemical Society, we aim to provide a exciting chemistry experience to all of our club members and anyone else we connect with on campus. Our focus is to demonstrate the many different routes a chemistry degree can take. We host events that double as chemistry demos such as an ice cream social. During the course of the year, we will host events such as high school outreach, research seminars, and postgraduate seminars. Although the main focus of the club is chemistry, you don't need to be a chemistry or biochemistry major to become a member. The events that we host will be beneficial to anyone with a science-related major. We host general meetings every other Tuesday, in room 404 of the Alfriend Chemistry Building. Our meetings are during activity hour, and we have free pizza.

Watch for updates about our group on our website (listed under the main Chemistry website) and our Facebook page.



# First Fall Department Picnic

Tuesday, October 2nd, the Chemistry & Biochemistry Department hosted our first fall department picnic on the lawn beside the Alfriend Chemistry Building. We had over 100 people attend and everyone enjoyed the food and fellowship. Attendees included graduate students, faculty, staff, undergraduate research students, ACS officers, and some other special guests. We are looking forward to many future outdoor picnics.







Dr. Pleban, Dr. Isenhour, Dr. Wallach, Dr. Lee, and Dr. Hatcher are enjoying the day.



We cannot thank our “grill master’s” enough for their hard work grilling the burgers and hot dogs! Kory and Watson withstood the heat and Dr. Cooper’s country music without one complaint.



A big thank you to Alicia Herr, Kristi Rehrauer, and Tammy Subotich for organizing the event.