Executive Editor: Marianne T. Johnson

Editorial Staff: Mohamed Bah, Shi Johnson-Bey, Zachary Sheffield, Amy Nicolas, Tobias Mazal, Kierstyn Harris

The editors wish to extend their gratitude to all who contributed articles to this newsletter and aided in its publication.

RISE Student Advisory Council Members (RSAC): Zachary Sheffield, Amy Nicolas, Shi Johnson-Bey, Kierstyn Harris, Tobias Mazal, Khalil Wynn
I am pleased to invite you to share in this edition of the RISE Program Newsletter. Throughout the academic year, as well as during the summer and winter, RISE Program participants are excelling academically; supporting our campus through their leadership and service; traveling to other countries to study abroad and making discoveries through research that can literally change our daily mode of operation. It is important that all those who have a vested interest in the students of the RISE Program understand the scope of the many accomplishments they experience during their matriculation at the University of Delaware.

We look forward to this newsletter serving as a vehicle to highlight our students and the many interests they have in addition to their primary goal of obtaining a degree in Engineering. Our students, along with the Graduate Counselor, Mohamed Bah have worked diligently to produce this newsletter and we hope you will enjoy the articles enclosed. We look forward to your feedback and your continued support.

Marianne Johnson ~ Academic Program Manager ~ Student Development & Support ~ RISE Program

The students and staff of the RISE Program wish to thank JPMorgan Chase for their generous support of our 2016 Student Achievement Convocation and Banquet.

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Through collaboration, intellectual curiosity and creativity, you can accomplish extraordinary things at JPMorgan Chase. Our people do outstanding work by partnering with clients and each other to generate positive change in our local and global communities every single day. With offices in more than 100 countries, we are committed to your growth and development. We offer opportunities across all of our businesses that can take you in any direction you want to go and leaders who will support you in getting there.
Candice Theodossiou
Class of 2007

Hi, my name is Candice Theodossiou and I am a Global Business Quality Manager at W.R. Grace. I graduated from the University of Delaware in 2007 with my Bachelor's of Chemical Engineering.

My first job was at BE&K (now KBR), an engineering firm, in Newark, Delaware. I had interned there during my tenure at UD and accepted a position when I graduated. However, I really wanted to work at a manufacturing plant. I got that opportunity when I received a call from W.R. Grace offering me a position in their two-year rotational program. I had interviewed with them in college but did not initially receive an offer. A year after I graduated I joined Grace's Manufacturing Leadership Program (MLP). The MLP Program took me through three unique positions in process engineering, production and Six Sigma at three different locations. When I finished I took a permanent position as a Production Engineer at our Baltimore, MD plant. I managed the day to day production and quality of alumina and chemical catalysts. In 2013, I decided to expand my skillset and I joined our corporate quality group as a Quality Engineer supporting various business within the company. A year and 1/2 later I was promoted to Quality Manager overseeing a business unit at Grace. In my current position I manage the overall processes and systems that drive quality compliance within our 3 manufacturing sites as well as our tollers.

At UD, I was actively involved in many organizations including NSBE, the Caribbean Student Association and was a founding member of Alpha Omega Epsilon (Engineering and Technical Sorority). I contribute much of my success at UD to the support of the RISE Program and the amazing lifelong friends that I made at RISE’s pre-freshman summer program. The emotional and financial support provided by the RISE Program helped me through the tough times you face as an engineering student. It was also through RISE that I was introduced to the Inroads program and got my first internship. To this day, I always remember the one thing that Ms. Johnson said at every monthly meeting "Never go to a meeting without a pen and paper!"

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Donald Ainsworth
Class of 1998

Hi, my name is Donald Ainsworth and I'm a Senior Director of Lean Enterprise Solutions at Amtrak. My job is to make the company work more efficiently by implementing a culture of waste elimination and continuous improvement.

I received a Bachelor’s Degree in Mechanical Engineering from the University of Delaware in 1998. As I look back at my time at UD, I am very grateful for the opportunity RISE provided me. The folks I met at the summer academy became my “village” and in many cases life-long friends. I have fond memories of our time working in groups, socializing, encouraging each other and commiserating over the challenging workload. Being a part of RISE was probably the single most important factor in determining my success at the University. It especially helped with the transition from high school. I needed the support system and relied heavily on the relationships I formed to acclimate to my new environment. Good times!

After graduation, I joined Dade Behring Inc., now Siemens Healthcare Diagnostics, as a Process Engineer responsible for a three shift operation packaging medical test packs. Shortly after that I enrolled in the MBA program at the University of Maryland. Upon graduation I joined GE Healthcare where I worked for 4 years split between Milwaukee, WI and the Northwest Suburbs of Chicago, IL. I later spent six years doing Management Consulting working for Booz Allen and IBM. I left IBM in 2012 to join Amtrak, where I currently work.
Hi, my name is Madupeola Fadugba. I received my Bachelor’s Degree in Chemical Engineering (‘08) and my Master’s in Economics (‘10) from the University of Delaware. I also hold a Master’s in Education from Harvard Graduate School of Education.

I currently live and pursue my passion in art in Abuja, Nigeria. My work generally emerges as series, an organic and intellectual process through which my ideas continually transform. My body of work has received international attention and recognition for pioneering interactive installation, *The People’s Algorithm*, produced for the National Art Competition, Nigeria, 2014. Awarded the *Outstanding Production Prize*, this participatory work responds to the Pan-African problems of unemployment, educational resources, and training. It creates an active dialogue about issues of social justice, identity, education and the use of art as a vehicle for activism.

While at the University of Delaware, I was recognized for my ability to transect disciplines, and I was commissioned to create *Beyond the Blackboard*, a permanent artwork portraying the impact of education and science on global development, which can be found displayed in Colburn Laboratory. In addition to *Beyond the Blackboard*, my work is found in over 60 private collections worldwide including: Canada, China, Nigeria, Rwanda, South Africa, Tanzania, the UK, and the United States.

At UD, I was an active member of the RISE Program, the Delaware African Student Association, and a McNair Scholar, as well as a recipient of the David Roselle Scholarship.
RISE NEWSLETTER
Words from RISE Alumni

Manuel Rafael Jiménez Díaz

I received my Bachelor’s in Chemical Engineering from the University of Delaware in 2010. The RISE Program played an integral part in my life even before I graduated high school. The reason I wanted to attend college was to earn the best degree in Chemical Engineering and soon had to decide between the No. 1 program in the US and the University of Delaware. Had it not been for the early contact and support from RISE, I would have attended a different University.

After my graduation, I was prepared to work for GSK in PA, but I was recruited to go to upstate NY and be part of a lab as a graduate student at the Rensselaer Polytechnic Institute (RPI) in upstate NY. Soon after joining RPI, I was granted an international fellowship (CONACyT) that supplemented my support for 4 years of my doctorate at RPI and was able to get my doctorate in Chemical and Biological Engineering. Now I am part of a consulting firm in Houston, TX for petrochemical and chemical companies and am excited to start a new phase in my life.

The University of Delaware was the best experience I could have asked for. While at UD, I was able to manage a demanding Chemical Engineering curriculum while being able to carry extensive undergraduate research, being an active member of the rowing team, and several other organizations such as the Minority Student Network (MSN), and the Society of Hispanic Professional Engineers (SHPE). RISE gave me a lot of feedback into how to better manage my time at UD early in my college track. I owe a lot of my success at UD to the initial meetings I had at RISE where I got invaluable help and advice. I also remember the academic and professional mentors I met through the programs sponsored by RISE that largely shaped the path in my career.

My advice to future and current students at the University of Delaware is to never be afraid to do as many activities as possible and be exposed to anything that you find interesting. You will be surprised with how many things you can tackle with a little time management and prioritization. There are many resources at UD to aid you; do look for them even when you are doing well.

Souleymane Bah

My name is Souleymane Bah. I graduated from the University of Delaware with my Bachelor’s in Electrical Engineering, in 2012. While at the University, I was an active member of the Delaware African Student Association (DASA) and the National Society of Black Engineers, (NSBE) where I was the Web Master. I was the Vice President of the Institute of Electrical and Electronics Engineers (IEEE), my junior year. After graduating, I took some courses to improve my coding skills and have been working as a Web Developer since. I spent over a year in Montgomery, AL working for the Department of Transportation on an application to replace all their legacy software. I am currently working for USPS in St. Louis, MO on their retail services software. From my professional experience, I have realized the importance of teamwork which was instilled in me from being a RISE member.

As an engineering student, you are told to expect that many of your classmates you started with may not be there at the end. However, being part of the RISE Program my peers and I beat those odds by working together and keeping each other motivated. As a Web Developer, those same rules have helped me prosper by being able to communicate effectively with my coworkers and helping new hires as my RISE mentors helped me.
RISE NEWSLETTER

Senior Article

My Experience at the UD as an Electrical Engineering Student

Ashley Johnson

In a few days I will be graduating from the University of Delaware. That’s a scary thought. I can’t believe how fast the time has gone by. I started out as an Engineering Undeclared student because I wasn’t exactly sure what I wanted to do. I soon found out that spring semester freshman year I had to choose one of the engineering disciplines, so I narrowed it down to what I thought I would enjoy most and just decided to pick one. Electrical Engineering turned out to be the major for me. Throughout these past four years I have learned a ton and grown so much. It wasn’t always easy: making it through four years of college in an engineering degree is a lot of hard work, but in the end it’s worth it.

I’ve learned about differential equations, circuits, and electromagnetics, but I also learned other important skills that will help me in life as an engineer, such as time management, teamwork, problem solving, and determination. Here are a few key points of advice that may help the underclassmen that are still trying to figure everything out:

- Go to class – even if you’re not paying full attention you’re still learning more than if you weren’t there
- Apply for scholarships – you’ll be surprised how much money you can win
- Find smart classmates to study with – sometimes you learn more from your study partners than you do from your professor
- Get sleep – it’s much harder to focus and get your work done when you’re running on no sleep
- Don’t procrastinate – makes life way less stressful
- Believe in yourself/confidence – we are all smart people. If you’re struggling put your mind to it and you can succeed
- Get involved – take advantage of what the University has to offer. You may make some of the best memories of your life
- Have fun – all work and no fun isn’t the best combination, find your perfect balance between schoolwork and activities

When I first started at UD I made a goal to get involved. Freshman year I decided it would be beneficial to do something outside of my comfort zone, so I participated in the Miss Black and Gold Pageant. This was a great experience: I made new friends, gained confidence, and won a trophy for Miss Congeniality. I continued to stay involved each year. I became the Membership Chair for the National Society of Black Engineers (NSBE) sophomore year, and the Community Service Chair for NSBE junior year. I am a math tutor for the Academic Enrichment Center and have tutored a variety of students, from freshmen to Ph.D. candidates, and learned how to work with different types of people. I enjoy tutoring because I am able to help others and encourage them to work hard and feel confident in their schoolwork. I was also a mentor for the Each One Reach One Program and the First Year Seminar Program, both designed to help freshman acclimate to college life throughout their first year. Last year I was inducted into Eta Kappa Nu Electrical and Computer Engineering Honor Society, which is an honor reserved for students in the top 25% of the class. Currently I am the Vice President of this honor society. I am also the treasurer of the Lambda Gamma Chapter of Alpha Kappa Alpha Sorority, Inc. As a member of Alpha Kappa Alpha Sorority, Inc., I also participate in community service events, and help plan and execute programs.

My involvement in each of these organizations and activities has helped shape who I am today, improving my leadership skills, and introducing me to different groups of people.

It’s also important to gain some experience doing internships. Over the summer after junior year I had an internship at PPL Electric Utilities in the Transmission Planning Department. My main task was to create contingency files according to new NERC TPL Standards. I wrote contingencies for the bulk power, which is the interconnected system of generation and transmission for the Lancaster region. At PPL Electric Utilities I learned how to read one-line diagrams, write contingency files, and was able to tour both distribution and transmission substations, and tour the control center.

After finishing my internship I was asked to return the next summer in the department of my choice. While I enjoyed the experience, I declined the offer because I wanted to try something new. My suggestion to my fellow engineering students is to start looking for internships and jobs early. It eliminates the stress of last minute applications and the uncertainty of not having something to do over the summer or once you graduate. Internships are helpful because they give you real world experience of what you could possibly do after graduating.

Also, while at the University of Delaware I’ve gotten the chance to do research. I work with Dr. Willett Kempton on his unique Vehicle to Grid demonstration project, the first of its kind, which is used for charging/discharging the vehicle battery to keep the electric grid stable. We have a fleet of about twenty electric vehicles that are capable of vehicle to grid services. My partner and I monitor this fleet 24/7 and make predictions to submit bids on power capacity. We reset the cars and clear the errors so that they will be back online and be able to contribute to the power capacity for regulation up and down. We also analyze the trends of this system to ensure that everything functions well. Dr. Kempton is expanding similar programs globally. He recently set up one in Amsterdam and asked my partner and I to monitor this as well. A few months ago I participated in a presentation to visitors from Japan who were interested in learning about this research and technology. It’s exciting to be working on a project that can change the way people view electric vehicles and the power system. Research was never something I thought I would be interested in, but I’m glad to have the opportunity to work on this project. I would suggest that if you get a chance to do research, take the opportunity.

Once I graduate I plan on staying at the University of Delaware to get my Master’s in Electrical and Computer Engineering. I was accepted into the MSECE 4+1 Program. I’m excited to be continuing school, but there are a few things I will miss about being an undergraduate. I think what I will miss the most about college are the friendships I have made throughout the years. It all began in the Summer Enrichment Program (SEP) where I met many students who I am still friends with today.

It’s crazy to think back to how much has changed since my freshman year. Not only have I grown, but so has the UD campus. When I first started, Rodney dorm/dining hall, Gilbert and Redding, and the Harker ISE lab weren’t here, and the Trabant lounge, Perkins, and the gym weren’t reserved for students in the top 25% of the class. Currently I am the Vice President of this honor society. I am also the treasurer of the Lambda Gamma Chapter of Alpha Kappa Alpha Sorority, Inc. As a member of Alpha Kappa Alpha Sorority, Inc., I also participate in community service events, and help plan and execute programs.

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RISE NEWSLETTER
Senior Article

“The Misconception About Being Busy”
Adam Engelson

The average semester for an undergraduate is 16 credit hours per week, but how many hours do you spend on extracurricular activities, sports, and socialization? In my time as an undergraduate, I realized that I needed to approach my schedule with a sense of balance. I participated in any opportunity that came my way. In addition to my courses, I was a RISE participant, the Webmaster for Deltronica, a member of NSCS and NSLS, and a volunteer for Deltronica. I also played intramural sports, socialized with friends, and most importantly, found a way to make work fun. With this balance, I knew a solution to my stress would be to cut back and allow some free time, but I let my desire to accomplish as much as possible cloud my judgment. Instead of addressing the activities that were directly causing my stress, I stopped doing things I enjoyed, thinking it would give me more time to relax and focus on my work. This decision significantly affected my stress.

I entered college with the mentality that a characteristic of a successful person was having a full schedule. As the fall semester ended, I was interested in participating in research in signal processing and circuit design, and a professor in my department recommended me to UD’s Office of Economic Innovation and Partnerships’ Spin-In Program, which connects students with local entrepreneurs to create innovative technologies. Beginning in January 2015, I worked closely with Dr. Brian Pryor, CEO of Litecure, on an interdisciplinary team of engineers, graphic designers, and business analysts to invent the ‘mTrigger’. mTrigger is a mobile biofeedback device that improves the efficacy of physical therapy by using electromyography to measure muscle activity.

Working on mTrigger, I continued to work part time at J.P. Morgan. I was working two more than 40 hours per week, and although my days were long, they were satisfying. I even began thinking about my projects when I wasn’t at work, because I enjoyed it. I loved the startup environment, and the challenge of an unsolved problem was inspiring rather than stressful. As the project concluded, I realized that I needed to approach the spring semester differently than I had the fall. Working with mTrigger, I felt confident and motivated to excel in other parts of my life. I continued working on mTrigger throughout the spring semester, finishing working at J.P. Morgan, and decided to pursue my own entrepreneurial venture.

Just before the spring semester started, I met with my friend to get dinner and we joked about inventing a machine to do the work we used to hate doing when we worked in restaurants back in high school. We suddenly realized that the idea wasn’t that far-fetched, and we had the skills to do it ourselves. Since that night, we have been developing an autonomous silverware wrapping machine to improve operations and sanitation issues in the restaurant industry. Last May, we were finalists in the Johns Hopkins University Business Plan Competition, and following the competition, we formed Agoge Automation, LLC, and I assumed the role of Chief Technology Officer.

The spring semester of my junior year was even busier than the fall. When I wasn’t studying, working on mTrigger, or attending to my extracurriculars, I was working hard on Agoge’s next steps. While most of the time this effort was worthwhile, sometimes I worked on Agoge when I should have been studying for an upcoming exam. I made this mistake several times, and I learned there are consequences to having tunnel vision.

During the summer before my senior year, with support from RISE and a Summer Research Fellowship from the University of Delaware, I participated in research with Dr. James E. Hoffman in his Visual Cognition Lab, while still working for mTrigger and on my own startup, but I was too interested not to make time for this research. I collected and analyzed event-related potentials captured by EEG sensor arrays to identify neural bottlenecks in the competing early and late stage visual processing of emotional distractors and target awareness. It was a very challenging summer, juggling my many duties. But this prepared me for my final year at UD.

My undergraduate experiences have inspired me to apply my interdisciplinary interests and entrepreneurial motivation to begin a career in biotechnology and medical devices, exploring and expanding the biomedical applications of microelectronics and signal processing. I am a 4+1 MSECE student, and I intend on completing my Master’s degree here at UD before entering the workforce, or pursuing my PhD in Electrical and Systems Engineering at the University of Pennsylvania.

It is easy to confuse being busy with being successful, and when we spend what little free time we have in college on things we are not passionate about, we are walking at graduation without purpose. While we should strive for academic success and a flourishing career, these efforts are futile if we sacrifice the pursuit of happiness for the pursuit of achievement. Success requires as much introspection as it does action, and the results of what we do is not nearly as important as the inspiration for why we do it. Whether this is your first or last year at UD, it is never too late to make time to find what inspires you to be your best.
RISE NEWSLETTER
RISE Student Activities
2015—2016
RISE NEWSLETTER
Meet Your RSAC Members

Zachary Sheffield, Senior
Chemical and Biomolecular Engineering
I’ve been a part of RISE for about 5 years, joining the summer before my Freshmen year, and a part of the RISE Student Advisory Council for roughly 3 years. When I first joined RSAC, I saw it as an opportunity to give back to the RISE community. I accumulated a significant amount of what I like to think is wisdom during my time as a Chemical Engineering student, and I wanted to share that with the RISE student body in hopes of making their journey through college a bit easier. Participating in RSAC was my way of helping others, and as a result I found myself extending this role outside the RISE Program. As a result, I’ve developed a greater sense of purpose and a so far unwavering determination to assist others in their endeavors. I’m more than grateful for the opportunity and I encourage anyone interested to participate.

Amy Nicolas, Junior
Chemical and Biomolecular Engineering
This is my third year in the RISE Program and my second year in RSAC. When I first joined RSAC, I did not know what to expect but I was excited about doing something new. I quickly learned that RSAC is an opportunity to represent my fellow RISE members and get more involved in the RISE community. I will always remember the day Mohamed asked who wanted to be a convener for RSAC at our bi-weekly meeting. At the time, I did not know what that would entail but I volunteered. Mohamed then informed me that I had to come up with an agenda for each meeting and conduct it. It definitely took me a few meetings before I felt comfortable conducting them. As a member of RSAC, I have been able to help with the Newsletter, the monthly workshops, as well as the annual RISE banquet. RSAC has helped me further develop my leadership skills and the friendships that I made are a nice bonus. I would undoubtedly recommend anyone who wants to be more involved in the RISE Program to join RSAC.

Khalil Wynn, Junior
Electrical Engineering
This is my second year as a member of RISE and my first being a part of RSAC. Last summer when I joined RSAC, I was welcomed with open arms. Since joining RISE I have had nothing but success inside and out of the classroom. A few things I’ve learned along the way are how to build a solid brand and keeping a great rapport with my fellow colleagues and professors. The perspective I have since becoming a member of RSAC is the amount of time that goes into planning events like the RISE Study Breaks or even the Saturday RISE Workshops. Moving forward I continue to thank Ms. Johnson for her contribution not only as the Director of RISE but the effort she puts in to make sure our fellow students are up to date with events and different activities that are going on around campus. I enjoy being on the RSAC and would recommend joining RSAC to everyone.

Shi Johnson-Bey, Junior
Computer Science, Neuroscience
I have been a part of the RISE Program for 3 years and have been a part of RSAC for two years. RSAC has given me a great opportunity to have an influence on my RISE experience. I believe that RISE can help students even more than it does now. My involvement in RSAC has given me the opportunity to voice my ideas. Aside from RISE I am the President of the Computer Animation & Game Design Club (CAGD). I enjoy designing video games and developing for virtual reality platforms. On top of CAGD, I am also the UD Microsoft Student Partner (MSP). As a MSP I lead monthly skills workshops for students.

Tobias Mazal, Sophomore
Chemical and Biomolecular Engineering
I joined RISE the summer before my freshman year, and became a member of RSAC later in the fall semester. I saw joining RSAC as an opportunity to offer my thoughts and help spread a passion for engineering as well as a chance to further immerse myself within a productive environment. As an RSAC member I’ve been able to play a part in putting together the RISE Newsletter and have also helped out with events such as the workshops and the end of the year banquet. I’m glad for the friendships and connections I’ve made through the RISE Program and I urge any eager RISE students interested in lending a helping hand for the community to come join the RISE Student Advisory Council!
In 1971, two Purdue undergraduate students, Edward Barnette (now deceased) and Fred Cooper approached the Dean of Engineering at Purdue University with the concept of starting the Black Society of Engineers (BSE). They wanted to establish a student organization to help improve the recruitment and retention of black engineering students. In the late 1960’s, a devastating 80 percent of the black freshmen entering the engineering program dropped out. The Dean agreed to the idea and assigned the only black faculty member on staff, Arthur J. Bond, as advisor. In April 1975, BSE became the National Society of Black Engineers. NSBE has since grown from 6 to over 31,000 members and the annual meeting has blossomed into the Annual National Convention; hosting over 8,000 attendees. NSBE has over 99 active NSBE Jr. pre-college, 250 student, and 68 professional chapters. For more information on NSBE, visit us at (nsbe.org).

The University of Delaware has an established chapter thanks to the Purdue pioneers in the 1970’s. The University of Delaware has manifested an abundance of rich NSBE history. Our chapter has held annual events such as College 101, a survival guide for freshmen, and the annual Show & Tell Fashion Show. The show informs students what type of clothes to wear in different business settings. Ultimately, NSBE is getting bigger and bigger because the need for African Americans in STEM majors is a necessity.

The mission of The Society of Hispanic Professional Engineers (SHPE) is to change lives by empowering the Hispanic community to realize its fullest potential and to impact the world through STEM awareness, access, support, and development. This year the UD Chapter of SHPE co-hosted several JP Morgan Chase events to network and learn more about the industry. SHPE also co-hosted a dodge ball tournament with the Biomedical Engineering Society for the University of Delaware’s annual Engineer’s Week. The event had participation from many different engineering majors and was a fun way to kick off E-Week. In April, SHPE hosted a soccer tournament open to all of UD. The event had food, prizes, and a fun, competitive atmosphere. SHPE also hosted a site visit to Gore Capabilities Facility and learned more about this engineering company. Overall, it was a great year for SHPE with many opportunities for members to network, learn, and have fun.

SASE started the semester with a resume workshop led by Ms. Ryan Fuller, who is the College of Engineering liaison from the Career Services Center. In October, a medical professions workshop was held to educate students on different types of medical-based careers. The 2015 National Conference was held from Oct 8-10 in Houston, TX, where members attended workshops and the largest career fair in the country for Asian Americans and Pacific Islanders. In November, SASE celebrated Spirit Week 2015 by participating in themed days such as school spirit, and cultural awareness. To end the fall semester, SASE sold finals week care packages to help students relieve stress and to introduce Asian snacks to students who are not familiar with them.
**RISE NEWSLETTER**

**Research Highlights**

**CHEMICAL & BIOMOLECULAR ENGINEERING**

A research group at the University of Delaware recently published their results regarding the discovery of a highly selective catalyst in the conversion of carbon dioxide to carbon monoxide in *Nature Communications*, a well-known science journal. The project was lead by Feng Jiao, and co-authored by postdoctoral fellow Qi Lu and graduate student Jonathan Rosen.

Carbon dioxide is a greenhouse gas, and as many of us know cutting back on greenhouse gas emissions has become a crucial engineering challenge in aiding the preservation of the atmosphere. Converting greenhouse gases to other compounds provides many benefits. In this case, conversion manages to reduce the carbon dioxide levels in the environment and additionally produces carbon monoxide, which may be further developed into more useful, non-toxic compounds.

The team determined that the conversion of carbon dioxide to carbon monoxide operates at 92% efficiency using a highly selective electrocatalyst. They found that a nanoporous silver electrocatalyst was 3,000 times more active than the polycrystalline form of silver which was commonly used in carbon dioxide conversion reactions. Silver itself is a good choice for this catalysis as it provides a high level of a selectivity for carbon dioxide (81%) and is relatively inexpensive. However, the exceptional reactivity of the electrocatalyst is due to its large surface area, Jiao postulates. The surface of this electrocatalyst is highly curved and 150 times larger than the polycrystalline silver. Therefore, the active sites on the catalyst require a smaller voltage, or less of a push, to surpass the activation energy barrier and promote the conversion of carbon dioxide.

The team compared their developed nanoporous silver electrocatalyst with other silver nanostructures and potential electrocatalysts and found that it held significant advantages over these alternative options. They are hopeful that the high reactivity of this catalyst helps to spur future advances in the field of greenhouse gas conversion.

**MATERIALS SCIENCE AND ENGINEERING**

In the quest to increase the density of data that can be stored within a given amount of space, nanoparticles has become very attractive due to their increased size to volume ratio in comparison to the bulk and thin film materials currently used to make hard drives. As materials size is decreased to nanoscale, a thousand times smaller than one single strand of hair, their magnetic behavior becomes structurally different to their bulk counterpart. One very important aspect of this size decrease is the energy required to reverse the magnetization over the energy barrier from one stable magnetic configuration to the other – this energy is known as anisotropy energy ($E_a$). $E_a$ is also inversely related to the thermal energy $k_BT$, where $k_B$ is the Boltzmann constant and $T$ is temperature. Therefore decrease in particle size/volume, in the pursuit of higher density capacity leads to lower temperatures at which the thermal energy can over take anisotropy energy. The onset temperature at which thermal energy over takes anisotropy energy is called the blocking temperature ($T_B$). Therefore, $T_B$ becomes a very important parameter when it comes to choosing materials to be used in high density magnetic storage.

Ways to increase the TB of nanoparticles has been subject to intense research, in recent years, as well as the research focus of Mohamed Bah. Bah, a fifth year graduate student in the Materials Science and Engineering Program, is the Graduate Counselor for the RISE Program. Mohamed and his collaborators have recently published work in Applied Surface Science, titled "Surfaces and their effect on the magnetic properties of polycrystalline hollow y-Mn$_2$O$_3$ and MnO nanoparticles". In their work, they showed how manipulating the morphologies of nanoparticles made of novel oxides can increase these parameters and make these nanoparticles good candidates for high density data storage.

**MECHANICAL ENGINEERING**

A research team at UD composed of Professors X. Lucas Lu, Xinqiao Jia, Joe Fox, and maxillofacial surgeon John Vorras recently received a grant from the Osteo Science Foundation to work on developing cartilage for the temporomandibular joint. The temporomandibular joint, or TMJ, holds together the lower part of the jaw to the skull, and is responsible for pain and discomfort in the approximately 10 million Americans who possess TMJ disorders. Lu states that the TMJ is “an important part of daily life, and it’s hard to ignore when it doesn’t function correctly.” TMJ disorders are typically due to degeneration of the cartilage, and as cartilage possess a limited regenerative ability, many are pursuing tissue engineering as a viable solution for cartilage loss. However, the cartilage found within TMJ varies significantly from the structure of the cartilage found within other joints, as it is, according to Lu, a “unique fibrous superficial layer, composed of mainly collagen fibers. To be effective, engineered cartilage will have to incorporate the structural heterogeneity displayed by this native tissue.” The project is among the first to reproduce a synthetic matrix resembling the unique structure of the condylar cartilage found in TMJ, but the team is hopeful for the research to ultimately be applied clinically.
**Student Internship Spotlight**

**Jessica Wong**

This summer, I worked at the Delaware Department of Transportation (DelDOT) as an Environmental Studies Intern. It was my first venture into working for the government and gave me a glimpse into all of the environmental aspects of the work that DelDOT does. When most people think of what the DOT does, they think of roads and construction; which is correct. But a lot of people don’t think about what goes into building a new road or a bridge. The section that I worked for handled work such as natural resources, historical preservation, and environmental compliance. There are a lot of rules that go into protecting the environment surrounding Delaware’s roads, such as preserving wetlands, and identifying endangered species.

I was able to experience things that I would have never been able to do on campus. I strapped on hip length boots and got into the streams underneath bridges to map out where they were for construction projects. I learned about all of the different types of plants and trees, as well as how to read a map. I also learned how to measure across a stream, which gave me a leg up in an assignment for one of my classes.

One of the most unexpected trips I took was to the I-495 bridge, where in 2014, was closed for construction due to unstable support columns. It had been nearly a year since then, and I was able to observe the site and check up on the status of the area and the repairs. It was interesting to see how parts of the Christina River had to be filled, and to see the pillars that had to be repaired. My time with the wonderful employees of DelDOT was something I would never trade. Everyone was patient and was always trying to help me learn something new. I never felt like I was left in the dark about any projects. The staff in the Environmental Studies section even threw a birthday party for me, which was so sweet and made me feel incredibly lucky to be there. I have only good things to say about my internship there and would recommend that students should look into working for the government at any level.

**Student Professional Development**

**Evan Carson**

Over spring break I attended my first National Convention for NSBE in Boston, MA. During my stay I got the most memorable experiences out of the career fair, meeting new people, and bonding with the members in my NSBE chapter.

Boston truly opened my eyes up and exposed me to how many people are involved in the National Society of Black Engineers. With over 9,000 registrants and over 200 companies present at the career fair I was able to do a lot of networking with my peers and potential employers. Some companies that I had the privilege to make connections with included Facebook, DuPont, Toyota, Caterpillar, and Turner Construction. One my most memorable experiences was being able to leave the Convention Center and go on a tour with Turner Construction to one of their sites in Boston. While touring we were educated on the process that Turner undergoes in order to create its buildings, problems that they run into, and the innovation that they use in order to overcome those problems. The National Convention exposed us to different people and chapters from all over the United States. Upon conversing with them I was able to get insight on how to get and retain members from the larger chapters, with ideas such as offering free registration for freshman to attend conventions and member of the month prizes for the general body. As well as methods passed down from smaller chapters, including how to obtain more allocations and fundraisers to bring in more money.

While in Boston, my favorite times were spent bonding with everyone who came to the National Convention in our chapter. As a group of people we were always cordial but our extended time together brought us closer as an organization. Together we stayed up late talking about each other’s dreams, plans for the future, making us closer than we have ever been. Since our time in Boston, our board has become more family like and more willing to work with one another. The trip to the convention was a success and hopefully will prove to help our chapter improve in the next coming years.
**RISE NEWSLETTER**

**Student Interview**

Monique Michalec

**How was your first semester of college?**

A: More fun than it should have been.

**Tell us about your experience with the RISE Program?**

A: RISE has allowed me to make great friends and to really be able to connect with other minorities within the engineering department. RISE also provides very helpful career building information and advice, such as career fairs, symposiums, and workshops, along with a wonderful support system. The tutoring provided by RISE is also very helpful. The RISE Program has been very beneficial for me.

**Why did you choose UD?**

A: UD has one of the top ten Chemical Engineering programs in the nation so that’s one of the biggest reasons I chose it. It’s also close to home and I liked the atmosphere.

**What campus activities/clubs/intramural sports/etc. are you in? Are you involved in any extra-curricular activities on campus?**

A: I am the treasurer of SHPE, the Public Relations Chair of SWE, a Beauty Team member for UDress magazine, and a member of Alpha Sigma Alpha Sorority.

**What inspired you to have an engineering major?**

A: I’ve always been good at math and science and had a passion for makeup but I didn’t want to just be a cosmetologist. I decided that I wanted to become a cosmetic chemist and make makeup. I chose Chemical Engineering as my major over Chemistry so that I’d have more jobs and opportunities after graduation.

**What campus activities do you participate in for fun?**

A: Being in a sorority is super fun and a nice distraction from the intensity of my major. Being on the beauty team of UDress is very fun for me too and allows me to do something that I’m passionate about.

**What have you changed since your freshman year?**

A: I definitely go out less and study more. I take advantage of the resources available to me more and I’ve gained weight.

**What are your goals when you graduate?**

A: I’d like to get a job right out of college at a cosmetics company and then pursue my dream of starting my own cosmetics line. I’d also like to travel the world and start a family.

**Where’s your favorite place to do homework on campus? Why?**

A: Perkins because it has Dunkin Donuts.

**How has your experience at UD impacted your decision in becoming an engineer?**

A: Being a Chemical Engineering student at UD has made me consider changing my major all the time. It has challenged me greatly and made me doubt myself many times but I know that if I can graduate this program, I can do anything and be successful in my career as an engineer.

**In your opinion, what personal qualities should a student possess to be a successful engineering student?**

A: Organization skills, time management skills, DETERMINATION, and a good work ethic.

**How did you find out about the RISE Program?**

A: The RISE Program reached out to me when I got accepted into UD.

**How has the RISE Program helped you in your process of becoming an engineer?**

A: I would fail everything without tutoring and the people I’ve met through RISE to help guide me. The older members of RISE really help me out by giving me old exams and letting me borrow their text-books.

**How do you feel about your major so far?**

A: It’s not the most fun and it’s very difficult, but it’ll be worth it.
RISE NEWSLETTER

Student Interview

Mohamed Seck

Tell us about your experience with the RISE Program?
A: RISE has exposed me to different clubs and opportunities that I would not have heard from anywhere else; for instance I had never heard of anyone talking about the National Society of Black Engineers until RISE brought it to my attention. Also, RISE makes us aware of the different internships and research opportunities that are available to us.

Why did you choose UD?
A: At first I didn’t like UD because it was a bit far from home. But then I realized, I’m going to meet people that make UD feel like my home; also it has one of the best Chemical Engineering programs in the country. Likewise, I did like how UD was both small enough for me to walk to everything and had beautiful grass and buildings everywhere.

What campus activities do you participate in for fun?
A: I do go to random meetings and movie nights for different things. I also get the chance to listen to a few guest speakers now and then. I also enjoy playing soccer and working out at the gym on my spare time. Just because I have a tough major does not mean that I cannot have fun.

How have you changed since your freshman year?
A: I have definitely become more responsible, due to time management, and wiser when it came to decisions that could have greater effects on me. In a way, you can say that I have truly matured.

Where’s your favorite place to do homework on campus? Why?
A: At first I did homework in my room, usually alone. However, I then began going to the ISE Lab to work with groups; I learned that working in groups is beneficial because if you are stuck on a problem, who are you going to ask? The ISE lab has a quiet environment and plenty of space for people to work in. For me, it’s better than being in a cramped room by yourself.

How has the RISE Program helped you in your process of becoming an engineer?
A: The program has helped me progress through college with the opportunities of extra-help and the different upper-classmen engineering students that I can contact.

How do you feel about your major so far?
A: At first I was a bit flustered about engineering after the first few classes of Introduction to Chemical Engineering, but I grew accustomed to the problems handed to us. Even though it is in fact one of the toughest majors one can have, I feel good about it and am confident that I will make it all the way through.
Taking up the Challenge

Eriq Gloria

Army R.O.T.C. is a program in college that allows students to get their degree as well as become an officer in the United States Army. This is my second year in the program. I felt like I didn’t contribute enough last year, so I decided to do a little extra this year. I signed up and tried out for Ranger Challenge. Ranger Challenge is a country-wide competition that is broken up into 8 brigades. The University of Delaware is in the 4th Brigade along with 41 other schools in this region. The competition is held at Fort Pickett, Virginia in the middle of October.

The very first day after we came back from summer break, we had to try out for the team. 11 of us made it, out of 20 people who tried out for the team. Tryouts were a week long and it tested our physical ability. A senior cadet ran the team, and he wanted to see how well we kept in shape over the summer. 9 out of the 11 people on the team were on it last year. I was 1 of 2 that were new.

At the 2014 competition, UD placed 26 out of 42 teams. We weren’t just trying to improve from the year before, we were trying to come in first by 5 points. We were in shock. We couldn’t believe that we moved up 25 places in just one year. Since we won, we were moving on to a world-wide competition at The United States Military Academy, West Point. It’s called Sandhurst.

Sandhurst is a military academy in England. In the 1950s, Sandhurst requested West Point hold an international competition that would allow countries to compete on the same battlefield. It was to build comradery not only with your team, but with other American teams and other countries.

The Sandhurst competition at West Point is the biggest military competition in the world. This year, there were 36 West Point teams; 8 R.O.T.C. teams, one from each brigade; one team from the Coast Guard Academy, one from the Naval Academy, one from the Air Force Academy; and 9 international teams. The international teams were China, Canada, Latvia, Germany, Korea, Japan, Chile, Mexico, and England.

Time for the competition finally came around and we were ready to go. Each of us knew what we had to do in order to win. The competition started at 6 a.m. and didn’t end until 7 p.m. Needless to say, we were all exhausted. We felt confident in how we performed just by the feedback we received from the graders, but we were skeptical about first place since UD has never won before. After all the points were tallied, we ended up placing first by 5 points. We were in shock. We couldn’t believe that we moved up 25 places in just one year.

Since we won, we were moving on to a world-wide competition at The United States Military Academy, West Point. It’s called Sandhurst. We had to do in order to win. We did a lot of hill workouts and ruck runs because West Point is in the mountains. We would even have tactics classes after practice in order to nail down our jobs. We came back from spring break a couple days early in order to head to West Point. We stayed there for a week before we actually competed. It was cool to get to meet other cadets, but also to see cadets from other countries. Some of the guys and girls from other countries weren’t even in college. They were 25 and older and had a lot more experience than we did.

This was a whole new experience for everyone. We knew we were going to have to work harder than we did in the fall in order to make our mark. We would practice 5 days a week and get up as early as 4 a.m. sometimes. Sometimes we would even practice on Saturday. We had to get physically and mentally tough because we were going to be rucking for 35 miles with about 40 to 45 pounds on our back. We rucked 24 miles and the second day we rucked 11 miles. In between, we had to sleep outside and temperatures reached as low as 20 degrees that night. By the end of the first day, we all had blisters on our feet, our legs were cramping, and we were tired and hungry. We started on a Friday at 10 a.m. and finished the next day at 11:30 a.m.

We were so happy that it was over, but we had no idea how we did. That night, there was an awards ceremony that announced each team’s place. We ended up coming in 19th out of 60 teams overall and 3rd out of 8 R.O.T.C. teams. We were more than happy with our performance. It was all due to the fact that we trained with each other for 7 months straight. We knew what motivated each other, what aggravated each other, how to pick someone up on an off day, how to effectively communicate with each other. It was truly a great experience and I thank all the guys and girls on the team who pushed me when I didn’t think I could go anymore.