



Zoua Pa Vang in Korea.  
More Postcards, page 6.

# The Cavendish Chronicle

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## Inside This Issue

High-Risk  
Obstetrics 4

Art of  
Chemistry 5

Alum Notes 6

Ardolf  
Anniversary 6

Postcards 6



## The Joys of Summer

*Talitha Burtis on an excursion from the Forensic Science Program in Glasgow*

Chemistry students reported lots of rewarding activities this summer, as did their compatriots in biochemistry. Here is our annual roundup of their experiences.

**Ana Grace Alvarado, Chem '20** is doing a Research Experience for Undergraduates (REU) through the Organization for Tropical Studies at La Selva Research Station in Costa Rica. Alvarado also participated in CSB/SJU's short-term study abroad program, "Politics, Society, and Culture in Cuba". **Ellen Arnold, Bchm '19** is interning in the office of Rep. Doris Matsui (D-CA). This summer, Ellen spent a lot of time in healthcare briefings learning about National Institutes of Health research and funding, insurance companies, and pharmaceutical lobbies.

**Jack Barsody, Bchm '19** is working in the stockroom in Ardolf Science Center, along with **Austin Hill, Bchm '19** and crew leader **Lauren Hennen, Bchm '20**. **Megan Barta, Chem '19** is employed at major agribusiness Land O'Lakes. **Miguel Bowe, Bchm '19** is doing research with **Seth Holland, Bchm '20** for **Dr. Annette Raigoza** at CSB/SJU. The team is seeking to construct controlled thin film morphologies on gold surfaces, analyzing their result using scanning tunneling microscopy. Raigoza is also hosting two Apollo High School students, Rahmo Abdullahi and Tyler Tran, through a grant from the Research & Engineering Apprenticeship Program of the U.S. Army. **Ellie Brewers, Bchm '18** is working in Residential

*(Continued page 2)*

## Summer Experience

(Continued from page 1)

Life at CSB, putting on events throughout the summer and revising programs for the incoming class in the fall. **Talitha Burtis, Chem '18** is participating in a short term study abroad program on Forensic Science and Criminal Justice in Glasgow, Scotland. It involves forensics topics such as fingerprints and footwear marks, hair and fibre identification, toxicology, pathology, and instrumental techniques.

**Connor Canfield, Chem '19** and **Allie Grodnick, Bchm '20** are looking at nanotoxicology at CSB/SJU with **Dr. M. A. Fazal**. The group is undertaking spectroscopic studies on the effects of nanodiamonds on common human blood proteins as well as the effects of oxidative stress on catalytic activity of enzymes.

**Davis Deanovic, Chem '18** is interning at pharmaceutical company Upsher-Smith. **Amy Demeritte, Chem '19** is mentoring in the FOCuS summer bridge program at CSB/SJU. **Mikayla DuFresne-To, Bchm '19** is working as a medical scribe with EPPA, helping in urgency rooms in Woodbury, Vadnais Heights, and Eagan.

**Bridget Ebert, Chem '18** is working at Children's Hospital in Minneapolis.

**Autumn Fuchs, Chem '20** is working with **Augie Witkowski, Chem '19** and **Heidi Koenig, Chem '19** in the Cloninger lab at Montana State University; the work is a collaboration with **Dr. Nicholas Jones** of CSB/SJU. Koenig is studying Diels-Alder reactions catalyzed by MacMillan-type imidazolidinone catalysts supported on PAMAM dendrimers. Witkowski and Fuchs are developing thiourea catalysts for use in aldol reactions.

**Will Gillach, Bchm '19** is doing research with Dr. Dave Mitchell of CSB/SJU Biology, examining the prevalence of antibiotic resistance in bacteria in the Central Minnesota area. Gillach also participated in a Regenerative Medicine Workshop at St Mary's University. **Taylor**

**Graham, Chem '17** is looking at pharmaceutical release from polymer films in the REU program at University of Puerto Rico, Mayaguez.

**Hannah Holst, Chem '18** is in the REU program at University of Tennessee, Knoxville. She is synthesising peptides and using click chemistry to gain an understanding of protein-protein interactions in Type I toxin-antitoxin loci in bacteria.

**Annette Klomp, Bchm '18** is doing a study in the University of Iowa Neuroscience Department. She has been studying turnover of several brain-specific mitochondrial proteins. Klomp is also President of the CSB/SJU chapter of Global Brigades; in May, she organized and participated in a four-day medical clinic in Choluteca, Honduras.

**Grace Lindquist, Chem '18** is a CSB/SJU Brandl Scholar on Public Policy in Washington, D.C.. She was posted to the International Affairs Department of the Air Conditioning, Heating and Refrigeration Institute, where she researches international energy performance standards and chemical refrigerant replacement. **Caitlin Loeffler, Chem '19** is at Miami University (in Ohio) evaluating high school chemistry activities that include the use of PhET simulations, open-access, interactive resources for physical science education.

**Molly Mendel, Bchm '20** is doing research on osteoclasts in the School of Dentistry at the University of Minnesota. **Clayton Merritt, Chem '18** and **Chris Oman, Chem '18** are doing atmospheric research with Dr. Christen Strollo at CSB/SJU. Oman is doing a kinetic and structural analysis of the aqueous oxidation of dicarbonyls using GC-FID and GC-MS. Merritt is studying the deliquescence relative humidity of mixtures of organics and salts present in atmospheric aerosol.

(Continued on page 3)



Bowe



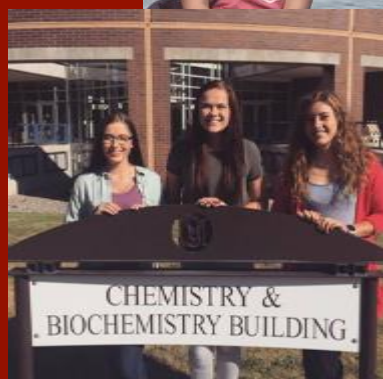
DuFresne  
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Grodnick



Lindquist



Koenig, Fuchs & Witkowski



Klomp



Loeffler



Nelmark



Oman

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**Claire Nelmark, Chem/Phys '18** is in the Physics and Interdisciplinary Materials REU at Penn State University. Her project is to analyze phonon modes in very thin (~10nm) topological insulators; she is learning techniques such as molecular beam epitaxy, Raman spectroscopy and atomic force microscopy. **Savanna Nolan, Chem '20** is working at RMB Labs, an environmental testing firm in Detroit Lakes.

**Wendy Osei-Bonsu, Bchm '19** is in the National Institutes of Health STEP-UP program at University of Pennsylvania. **Renae Otto, Bchm '18**, is an emergency medical technician at Canterbury Park.

**Casey Palmer, Bchm '18** is at the Strong Children's Research Hospital in Rochester, NY, where she is conducting neonatal immunology research and shadowing physicians. **Shelly Peterson, Bchm '18** is interning at Biomerics Advanced Catheter, a contract manufacturer that specializes in the design, development and production of medical devices located in Brooklyn Park, Minnesota.

**Janna Quick, Chem '19** is in the Genes and Environment REU program at the University of North Dakota. Janna's project explores vascular factors in epigenetic changes within neural stem cells.

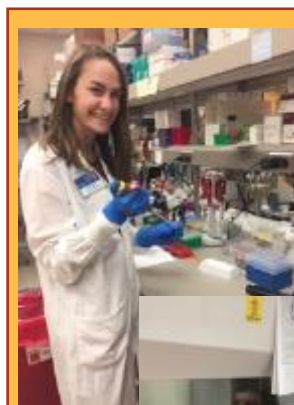
**Corrine Seehusen, Bchm '19** is doing research at the Worcester Polytech Institute's Chemistry and Biochemistry

REU Program. She is trying to identify protein binding sites using hydrogen-deuterium exchange mass spectrometry; the goal is to develop peptides that ultimately can be used to control the response of cells to certain stimuli. **Sarai Seymour, Chem '18** is in the Health Sciences Summer Undergraduate Research Experience at the University of North Dakota. **Riley Swenson, Bchm '18** has a summer internship at the Mayo Clinic in collaboration with the Lupus Foundation of Minnesota. She is studying the role of interferon levels and T-cell receptors in autoimmune disease.

**Brandon Thauwald, Chem '18** is doing an internship at Boston Scientific, a prominent medical technology company. **Mitchell Thelen, Bchm '19** is spending the summer as a medical scribe in St. Cloud. **Samantha Tinucci, Chem '18** is participating in the University of Utah Materials Research Science and Engineering Center. Her project focuses on microbial fuel cells which are an alternative to the more prevalent hydrogen fuel cells.

**Dominic Vigliaturo, Chem '19** is participating in a research internship at Southwest University in BeiBei, China, where his work has already been included in a publication on photoredox catalysis. The program is sponsored by the Center for Global Education of CSB/ SJU. **Joe Vorderbruggen, Chem '18** is doing

research on the toxicological effects of engineered nanomaterials at the University of Montana Missoula REU. His focus is on titanium and zinc oxides.



Swenson



Palmer



Tran and Abdullahi

## Alumna Finds Rewards in High-Risk Obstetrics

By Bridget Ebert



Tina Shumard and Family

Not many doctors can work on two patients at once, but **Tina (Veek) Shumard, Chem/Biol '04** can do it with ease. Shumard works with expectant mothers as a maternal fetal medicine physician in Knoxville, Tennessee. She and her care team at High Risk Obstetrical Consultants are affiliated with the University of Tennessee Medical Center.

A typical day for Shumard is packed full of patients. Some days involve ultrasounds, office consultations, delivering high risk pregnant women in labor, and even complicated procedures like amniocentesis or cervical cerclage. Most of her days, however, are spent evaluating fetuses for abnormalities and instructing general obstetricians on how to care for women with complicated medical problems or complicated pregnancies.

In addition to her passion for outstanding patient care, Shumard is dedicated to passing on her expertise to future doctors. On top of the countless hours she spends with patients, Shumard works at a hospital involved in training future OB/GYN doctors. She spends a significant portion of her day teaching resident OB/GYNs and medical students about how to care for pregnant women, perform successful deliveries, and how to care for some of the more common complications of pregnancies like preterm labor, preeclampsia, and diabetes.

As evidenced by her commitment to educating new generations of OB/GYNs, it is clear Shumard loves what she does.

“By specializing in high risk pregnancies, it allows me to help women at one of the scariest yet most exciting times of their lives,” Shumard said. “Being able to help bring a newborn into the world, especially after a complicated or difficult pregnancy, is very rewarding. It is the best part of my job.”

Shumard has always stayed busy. During her time at CSB, she was in chapel choir, served as a chemistry tutor, and worked two summers in the chemistry department research program. After her four years in St. Joseph, she went on to the Medical College of Wisconsin in Milwaukee. Upon graduation, she moved to York, PA for her four-year OB/GYN residency, later completing a three-year fellowship in Maternal Fetal Medicine at Wake Forest School of Medicine in Winston-Salem, NC. During her residency and fellowships, Shumard worked on multiple research projects, many involving preterm birth and cervical shortening—her particular area of interest.

Nowadays, when she is not busy helping other people expand their families, Shumard enjoys reading, quilting, and spending time with her own family—her husband and 15-month-old son, Jackson. When asked whether tropical retirement plans are in store for the distant future, Shumard said for now, she is happy to continue educating medical students and OB/GYN residents while providing quality care for her patients.

“I am excited to watch my family grow and change as our son grows up and I want to try to find a good work-life balance which is a struggle for many professionals,” she said.

When it comes to the future, one thing is certain: Shumard will undoubtedly continue to touch lives and serve as a role model for her family, patients, future OB/GYNs, and aspiring physicians at CSB.



# The Art of Chemistry: Musical Scientists

By Makenzie Horrigan

The right side of the brain is commonly associated with performing creative tasks, such as the arts, while the left side of the brain is associated with performing logical tasks, such as chemistry. Although we sometimes hear about right-brain people or left-brain people, it is not uncommon to find scientists who are really both. Albert Einstein, for example, was an avid violinist, resorting to his instrument when he was particularly stuck on a scientific problem. A liberal arts institution, like the College of St. Benedict / St. John's University, allows students and professors alike to work both sides of their brain. A number of chemistry and biochemistry students take advantage of that liberal arts nature of by participating in the various musical ensembles on campus.

**CJ Pettinger, Behm '17** is a recent graduate whose family supported her interest in music from a young age. That interest led to a music minor at CSB/SJU. Her interest in biochemistry, on the other hand, was fueled by her craving to know the HOW of things. She played bass, bass guitar, and viola de gamba in six different ensembles on campus, including Orchestra, Jazz Ensemble, Wind Ensemble, Jazz Combo, Bass Ensemble, and Viol Consort.

**Josh Gavin, Chem '19** also became dedicated to music at an early age. He joined his school's choir in 4th grade. He picked up the trumpet in 6th grade and played all through middle school and high school. Gavin decided chemistry was the right subject for him as a senior in high school, and enrolled at CSB/SJU upon his acceptance to the FoCuS program. Now, he plays principal euphonium in the Wind Ensemble, Brass Choir, and takes lessons with CSB/SJU music professor Justin Zanchuk.

Music and chemistry may appear to be as different as the two sides of the brain, but just like the brain, they are fundamentally made up of the same materials. Pettinger pointed out that music and biochemistry are similar in that they both have small components that make up a larger picture. As a music student, Pettinger says, "One needs to consider what message the composer was trying to get across with the piece, how does it fit with other pieces of the time, how does one part fit with the other parts." Similarly, as a biochemistry student, she must "look at how different substrates or drugs can affect multiple pathways, how the processes are affected by other factors, such as thermodynamics." However, in both music and biochemistry, it is easier to break the larger picture down into one measure or a single reaction to create a better understanding.

Thought processes of music and solving chemistry problems involve different sides of the brain, but that doesn't mean that they are mutually exclusive. Pettinger's connection between large and small pictures in music can help chemists work through difficult problems. "Music has helped me be able to think differently about chemistry and biochemistry by helping me think through all aspects of a problem or a reaction." Many answers to chemistry require some creativity, and music has an abundance of creativity. "My musical experience taps into my creativity and allows me to find how that portion operates," Gavin said. "It encourages me to ask more questions and explore new ways to solve problems presented to me."



*Gavin and the Euphonium*

The two sides of art and science come together to make stronger individual musicians and scientists. "As a chemistry student in a musical ensemble, I gain multiple backgrounds that really support the liberal arts idea that our institution is built upon," Gavin says, "I build myself as a person by developing skills that originate from multiple backgrounds." Pettinger agrees that music has helped her become a better chemistry student. "Music has helped me be able to think differently about chemistry and biochemistry by helping me think through all aspects of a problem or a reaction," she says.

The experiences gained by being a simultaneous student of chemistry and music have created better academics at CSB/SJU, but they have also created relationships that will last into the future. What does one gain by being a musical chemist? "Some good friends who are also in science, music, or both!" Pettinger says. Gavin says, "I gain new friends of incredible diversity of all kinds from both chemistry and in the ensembles."

## Ardolf Anniversary Planned for October

This fall marks the 25<sup>th</sup> anniversary of the Ardolf Science Center. To mark the occasion, the chemistry and nutrition departments are planning two events for Homecoming Weekend.

A social hour is scheduled for the evening of Friday, October 6<sup>th</sup>. On the morning of Saturday, October 7<sup>th</sup>, guests can visit over coffee and then enjoy brief presentations by faculty and student alumni, beginning at 9:00. Activities will finish before the homecoming game and events get underway at SJU.

Registration will be available through the alumni office.



### The Cavendish Chronicle

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## Postcards from Abroad

**Omar Cano, Bchm '18** (Segovia, Spain): "The Roman Aqueduct is by far my favorite landmark in Segovia, Spain. Due to its central location, our group used it as a meeting place for a variety of purposes including excursions, tapas and much more. On this last day, I'm a child, looking for a smooth surface to bounce my bouncy ball."



**Jordan Danielson, Chem '18** (Segovia, Spain): "Spain has been such an exciting experience. I've been blessed with awesome host parents and a wonderful city to call home. I've learned so much about Spanish culture and I know this experience will stay with me for the rest of my life."



**Nathan Libra, Bchm '18** (Eichstatt, Germany): "Here is a picture of me when I was touring the city of Bamberg. The building in the background is the town hall or Rathaus in German."



## Alum Notes

**Julie Mayers Benson, Chem '90** was recognized as the 2017 Family Physician of the Year by the Minnesota Academy of Family Physicians.

**John Geissler, Chem '99** is the new director of the Saint John's Outdoor University.

**Valdez Rahming, Chem '12** has completed medical school at St. George's University; he is in residency in anesthesiology at the University of Texas Health Science Center in Houston.

**Brandon Plante, Bchm '13** is working at Medtronic; he has a master's in neurological science from Iowa State University.

**Dameine Stewart, Chem '13** finished a master's in computer science

and systems at University of Washington and has accepted a position at Microsoft.

**Zach Brown, Chem '15** has received a \$1500 Hatch Grant from the American Chemical Society for the purchase of lab supplies. Brown teaches chemistry and physics at Sauk Rapids-Rice High School.

**Christian Wilmore, Bchm '16** is teaching chemistry at St. Augustine's College in Nassau, the Bahamas; he is also pursuing a diploma in education at University of the Bahamas and a master's in organizational leadership at Barry University, FL.



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