

The Cavendish Chronicle

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Forrest Hyler conducting photolysis. More research inside.



Fertile Ground for Exploration

Meghan Glasgow at Land O'Lakes

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Chemistry and Biochemistry majors had an array of experiences over the summer. Some explored career options, others engaged in service, and some worked hard to pay those tuition bills.

A number of CSB|SJU students got experience in the laboratory. At Ardolf Science Center, students did research in a range of areas, including organic and biochemistry. **Becca Flynn, Chem '16** and **Sam Tinucci, Chem '17** worked with the **McIntee & Jakubowski** lab. The group is developing new inhibitors for the enzyme low molecular weight protein tyrosine phosphatase, with the ultimate goal of new

anti-cancer agents. "We use a variety of techniques such as molecular modeling, synthesis, protein expression, and biological assays," said Ed McIntee.

The **Graham & Jones** group has been working on two projects based on amino acid scaffolds. **Adrian Demeritte, Chem '16** made strides on a novel synthetic approach to the tripeptide based marine natural products Janolusimide A & B. **Thomas O'Toole, Chem '17** developed a new method for preparing N-propargyl amino esters via reductive amination.

Two research groups in Ardolf explored the realm of analytical chemistry. **Joe**

Freemark, Chem '16 and **Alex Vanyo, Chem '17** worked with **Dr. M. A. Fazal** investigating the effects of magnetic nanoparticles on two important proteins (*continued page 3*)



O'Toole: A boy and his NMR

Patenting Global Innovations for 3M



Lapos and family on a hike

“I am constantly learning.”

Julie Lapos, Chem '97 is a busy woman. She has a docket full of applications to draft, a garden to tend and three kids learning to ride bikes. Nevertheless, she manages to get it all done and stay sane with a little luck and a lot of organization.

Lapos is a patent agent, registered with the United States Patent and Trademark Office (USPTO) and employed by 3M. She works with inventors in the company to draft patent applications covering new ideas. Once she files a patent application, the patent office searches the publicly available art, including patents and the literature, and issues a search report. If the patent office deems that the invention is not patentable, she has the opportunity to present counter arguments or else amend the claims to make a stronger case.

There are subtle differences between patent agents and patent attorneys.

“In front of the patent office, the attorney and

agent do the same things,” Lapos explained. “However, a patent attorney has graduated from law school and has passed a state bar allowing them to practice law. This allows the patent attorney to do additional things regarding intellectual property, including signing contracts such as a confidentiality disclosure or licensing agreement and providing legal advice such as infringement analysis and product clearance.”

A native of Little Falls, Lapos chose to attend CSB because it was close to home and was a small campus. However, when the time came to choose a graduate school, she was ready to venture out east. A Ph.D. in analytical chemistry from the Pennsylvania State University meant a few years away from Minnesota, but she was hired directly out of graduate school by 3M to work in their pharmaceutical division. After working there as an analytical chemist for 5 years, she faced a decision when 3M announced that it was spinning off its pharma division. She started looking for other jobs, but ended up becoming a patent agent and staying with 3M.

Registration with the USPTO required a science degree, which Lapos had, as well as demonstration of competency in preparing, filing, and prosecuting patent applications in the United States. That meant passing a six hour exam, although that requirement would have been waived had she worked previously as a Patent Examiner at the USPTO, a post that also requires a four-year degree in science or engineering.

She thinks one of her best experiences at CSB/SJU was the opportunity to gain lots of practical lab experience in chemistry. She did research with **Mike Ross**, working on methods to monitor water quality in the local watershed.

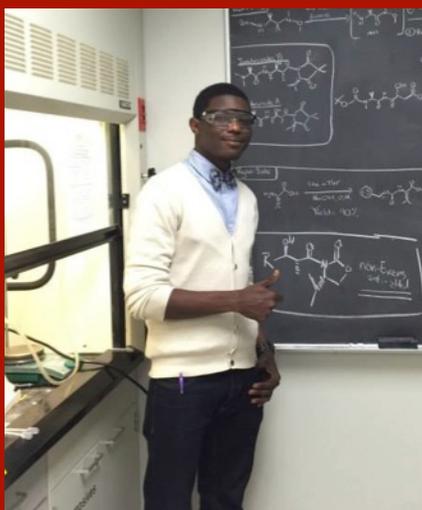
“I enjoyed the freedom research afforded,” Lapos explained. “That is why I went on to graduate school and why I studied analytical chemistry.”

She loves the place where that experience has led. She has a job that is flexible enough to work at home if she needs to. She likes the gratifying feeling of meeting deadlines and crossing accomplishments off her list. Also, she thrives on the intellectual stimulation.

“I am constantly learning,” she explained. “I learn a new area of science all the time. I spend a lot of time talking with brilliant people, understanding their invention, and strategizing how to draft the application and where to file.”

As the warm days of summer wind into fall, Julie Lapos will take her family on more walks, spend a little longer outdoors as the sun wheels down to the horizon, and prepare her garden for another Minnesota winter. She will also cross another patent off her list, and dive in to the next one.





Demeritte



The Raigoza lab: Schlangen, Kress, Giinther, Raigoza



Freemark

Summer Explorations (from page 1)

(myoglobin and lysozyme) using different spectroscopic techniques. Engineered nanoparticles are an essential component in the emerging field of nanomedical imaging and therapy; their interactions with biomolecules is thus a matter of urgent interest.

The **Strollo** research group is interested in the aqueous phase chemistry of secondary organic aerosol (SOA) formation. **Forrest Hyler, Chem '16** and **Lorien Rusch, Chem '16** simulated aqueous phase atmospheric reactions in the laboratory. They used a variety of techniques, such as HPLC-UV/MS, GCMS, and IR spectroscopy, to elucidate oligomer formation in wet aerosol and the subsequent fate of these aerosols.

Zach Brown, Chem '16 and **Tyler Dick, Chem '16** performed research with **Dr. Alicia Peterson**, continuing an investigation into new methods of treating groundwater contaminated with halogenated compounds. Explorations included the thermodynamics of the Rh/Al₂O₃-catalyzed degradation of trichloroethylene as well as the reversibility of sulfite binding on the catalyst.

Physical chemistry was also represented on campus. The

Raigoza Group is interested in fundamental studies on the interactions of biological materials with surfaces. **Alex Schlangen, Chem '16** and **Rejene Giinther, Chem '17** were part of the team this summer. They used films of organic molecules (self-assembled monolayers) to modify the properties of a surface, thereby altering its interactions with known biological materials. In addition, **Paul Kress, Chem '16** worked on a joint **Raigoza-Jones** project, characterizing the morphology of PAMAM dendrimers. Kress also worked in the stockroom, along with **Destiny Johnson, Chem '18** and **Casey Palmer, Bchm '18**.

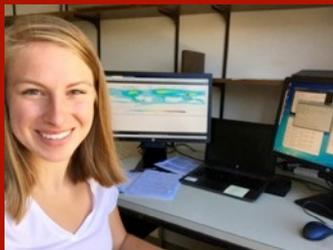


All together: Summer '15 research students gathered in Ardolf

Emma Johnson, Chem '16 had a research internship with Dr. Kate Bohn-Gettler in the Education Department. The project looked at the effects of emotional states on comprehension of chemistry texts.

Several students explored Research Experiences for Undergraduates (REU) on other campuses. **Claire Buysse, Chem '17** participated in an internship through the Joint Institute for the Study of the Atmosphere and the Ocean on the University of Washington-Seattle campus. She ran model simulations on the transport and deposition of sulfate aerosols to Greenland, and analyzed how the process affects the ice core record.

A few students explored the interface between green chemistry and new materials. **Faith Kersey-Bronec, Chem '17** took part in the Renewable Energy Materials Research Science and Engineering Center REU at the Colorado School of Mines. She was placed in a lab that focuses on lithium ion batteries and fuel cells as renewable energy sources. Using battery analysis, cyclic voltammetry and electrochemical impedance spectra, she analyzed the capacity and stability of batteries containing prelithiated compounds as anode material. **Haley Chatelaine, Chem, '16** was at South Dakota State University researching deep eutectic solvents as green media for biphasic, biocatalytic esterification. "The result



Buysse



Twumasi



Chatelaine makes a few small repairs



Tutol shows off her work

we're hoping for is a high-yielding, simple, green, continuous process that can be scaled up for potential use in fields like food, cosmetics, and, most importantly, biodiesel production," explained Chatelaine. **Raymond Twumasi, Chem '17** studied "slimy" renewable materials in the Material Research Science & Engineering Center, University of Minnesota. Poly-ε-caprolactone is a biodegradable and biocompatible polyester used in a range of medical applications; Twumasi worked on modifying the polymer with hyaluronic acid, which has been shown to resist nonspecific protein absorption and cell adhesion. **Taylor Graham, Chem '18** was at the University of South Dakota School of Mines, working in the Department of Materials and Metallurgical Engineering.

Jasmine Tutol, Chem '16 also explored materials science. She spent the summer with the U.S. Food & Drug Administration under the National Center for Toxicological Research in Little Rock, Arkansas. Her project involved subjecting gold nanoparticles to different sizing methodologies such as dynamic light scattering, nanoparticle tracking analysis, and electron microscopy.

Several students found experiences with biomedical applications. **Emma Bonglack, Bchm '17** conducted research in a parasitology lab at Yale University. By over-expressing a specific gene, she hoped to probe the life cycle of

trypanosoma, a parasite found in the tsetse fly that is the vector of African sleeping sickness.

Sarah Clark, Bchm '17 found an REU at the School of Medicine and Health Sciences at the University of North Dakota. She researched the activation of adrenergic receptors in the brain, with a long-term goal of treating aging and neurodegenerative disorders in the human brain. **Hieu Van, Bchm '16** was at MD Anderson Cancer Center in Houston, TX, where she investigated the connections between inflammation and cancer. **Ben Kollaja, Chem '16** was part of a



Soiro

collaboration between the Avera Institute for Human Genetics and the University of South Dakota. Using DNA samples from the Netherlands Twin Register, they hoped to show that telomere length can be accurately measured with DNA extracted from simple buccal swabs rather than depending on blood samples. **Frantz Soiro, Chem '16** used DNA extraction and PCR detection to study the prevalence of disease-causing *Ehrlichia sp.* in lone star ticks, a project of the New York Department of Health. **Maria McGlinch, Chem '16** and sister Erin worked in the Anesthesia



Kersey-Bronc in the glovebox

Department Uniformed Services University of Health Sciences in Bethesda, MD. Their research focused on malignant hyperthermia, a genetic disorder that can cause a hyper-metabolic response to certain anesthetics. **Scott Echternacht, Bchm '16** interned in a lab at the Center for Memory and Aging at Regions Hospital in St. Paul, MN, investigating the effect of novel drugs for Alzheimer's and Parkinson's disease.

Other students placed a priority on shadowing experiences. **Jane Keohen, Bchm '16** participated in the University of Toledo Summer Undergraduate Research Fellows program, combining case study research on brain abscesses – which she hoped to publish -- with rounds in the hospital. **Kyle Spengler, Bchm '16** spent time at Colorado University-Boulder working on a



Bonglack



McGlinch & McGlinch



Kollaja



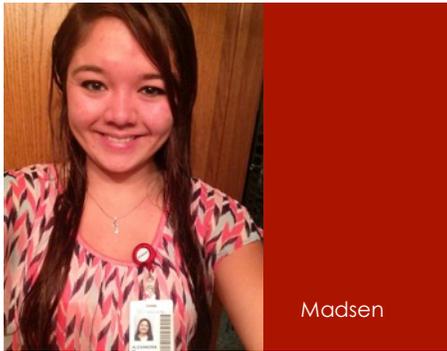
Keohan



Clark



Lerick



Madsen

biochemical polymer "plastic wrap" to transport vaccines without the need for refrigeration. He also did some work as a medical scribe. **Niesha Ford, Bchm '17** volunteered at a free clinic in Richmond, CA, and did an internship at Kaiser Permanente.

A few students found valuable industrial opportunities. **Meghan Glasgow, Chem '16** interned with Land O' Lakes at the WinField Solutions site in River Falls, Wisconsin. She formulated herbicides, pesticides, and insecticides to make them green yet effective. **Matt Lerick, Chem '16** worked at Minnesota Valley Testing Laboratory in New Ulm, MN. He extracted, concentrated, and prepared water and soil samples from all over the Midwest to be analysed for diesel-range organics. **Jenny Paul, Chem '17** interned at Microbiologics in St. Cloud, optimizing the freeze-drying of bacteria. "Our product is a freeze-dried capsule of bacteria that research companies can rehydrate and grow, having standardized colonies to do research," said Paul. **Kirsten Sewall, Chem '16** continued her job at the St Cloud Water Treatment Plant. She plans to do a capstone research

project at the water lab.

Pre-pharmacy students garnered experience during the long summer days. **Alex Madsen, Chem '17** was a pharmacy clerk with Fairview Pharmacy in Andover, whereas **Adam McVey, Bchm '17** studied to become a certified pharmacy technician while at the HY-VEE clinic pharmacy in Marshall.



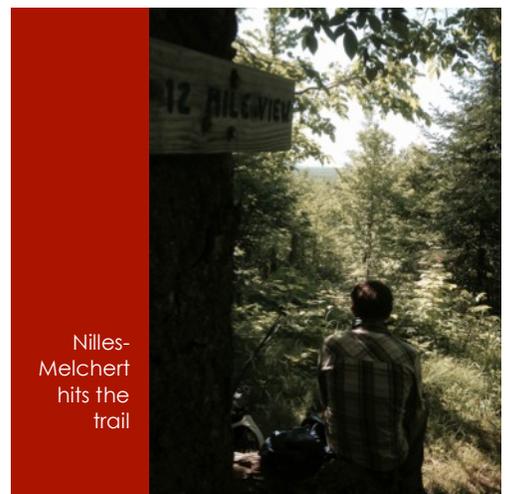
Pettinger out on the lake

A couple of students fit in some service experience. **Heather Kaluzniak, Bchm '17** played soccer in Brazil, then traveled to Ecuador, where she helped to set up a water purification system and a community dental clinic in Otavalo. **CJ Pettinger, Bchm '17** spent a week in Honduras with Global Health Affairs/Global Brigades, providing medical and dental care to two rural mountain communities. Upon her return, she headed north to be a canoe guide with the Girl Scouts' Northern Lakes Canoe Base. Working with youth is a perennial summer occupation. **Cody Kohout, Bchm '17** worked as a coach for a high

school strength team and also helped out at Kids Company, a day camp.

In a unique experience, **Ellen Monzo, Chem '17** attended the six week National Nuclear Chemistry Summer School sponsored by ACS and the Department of Energy, finishing at the top of her class.

College is expensive, and students need summer jobs. **Griffin Schroeder, Chem '18** conducted cave tours. **Tom Nilles-Melchert, Chem '16** worked as a fish processor at Leader Creek Fisheries in Alaska, an intensive experience of 16 hour shifts, 7 days a week for three weeks. "Tough work, but definitely glad I did it," said Nilles-Melchert, who also worked at Applebees. "In my free time, I have gone backpacking and shadowed a few doctors." Isn't that what summer is for?



Nilles-Melchert hits the trail



Bonglack

Bonglack Scores with ACS Award

Emma Bonglack, Bchm '17 has received an ACS Scholars Award. Bonglack will receive a small scholarship and will also be matched with a mentor.

The American Chemical Society Scholars Program provides annual scholarships to under-represented students who

want to enter the field of chemistry or related areas. The program also helps build awareness of the value and rewards associated with careers in chemistry. Furthermore, the program assists students in acquiring skills and credentials necessary for a successful career.



Chatelaine Leads Club Toward ACS Affiliation

Incoming Chem Club President, **Haley Chatelaine, Chem '16** has scored an early coup. The Lakeville, MN, native wrote a small grant application to the American Chemical Society and was funded for \$300.

This "kickstarter" grant is intended to fund CSB/SJU Chem Club's effort to become an ACS Certified

Chapter. "This will give us more 'street cred'," explained Chatelaine, "and opportunities for grants to do things like travel, make programs at regional meetings, interact with the community, make new activities, and interact with other chapters."



Alumni Participate in Summer Seminars

The chemistry department hosted a short summer seminar series this year.

Wallace Fu, Chem '67 returned to St. Joseph for three talks. He addressed "Soft Skills" with the FoCuS cohort, stressing the importance of initiative, cooperation, and persistence in the workplace. For research students, he gave two talks. The first was on safety in an industrial setting. The second was a research account on the synthesis of Artemisinin, an anti-malarial drug. Fu has a background in both teaching and industry.

Lisa Jungbauer Nikolaus, Chem '99 also paid a visit to the summer FoCuS cohort. She gave a presentation on "a day in the life" of a senior scientist at Medtronic, illustrating her experience in biomedical industry.



Chatelaine

Road Trip: A Meeting with Medtronic



A group of chem & biochem students paid a visit to Medtronic at the end of April. The tour was facilitated by **Kate Graham** and **Ed Mcintee** as part of Chem 116; other students were invited along. Students had a chance to meet with **Lisa Jungbauer Nikolaus, Chem '99** (far left) and **Josh Casey, Chem '99** (far right).

Postcards From Abroad



Haley Chatelaine, Chem '16; Cuba, May term (left): Here's a picture of me in front of the Che Guevara Memorial. It's both a monument to him and the place where his remains lay. Che was instrumental in the Cuban revolution (and Guatemala and the Congo and others). Kids even have a pledge they do in school where they say, "Seremos como Che" ("We will be like Che").



Scott Echternacht, Bchm '16; Nelson Mandela Metropolitan University, Port Elizabeth, South Africa, spring term (right): This photo was taken atop a mountain in the Winterberg Mountains in the Eastern Cape, South Africa. From volunteering weekly at an orphanage for children affected by AIDS to relaxing on the beach and everything in between, this study abroad trip has been absolutely amazing.

FoCuS 4.0 Arrives for the Summer

Cohort Program has Scholars Live & Study Together



CSB|SJU's FoCuS program welcomed a new group of students into the summer bridge program in June. A moving day barbecue marked the start of the fourth iteration of the program.

Graham. Graham, along with **Annette Raigoza** and **Ed McIntee**, interviewed dozens of candidates for the cohort. Candidates were selected based on interest in chemistry, career goals, ability to work in a team, and potential for success in the cohort group.

FoCuS is sponsored by the National Science Foundation under a grant directed by **Kate**

Ed McIntee on the grill (above);
The FoCuS class of 2019 (right)

Stephanie Jean, Chem '17, FoCuS
mentor (with Simone Creed, Bchm '18)



The Barta clan arrives, including
Jennifer (Schweich) Barta,
Chem '91 (left), and Megan
Barta, Chem '19 (right)





The Cavendish Chronicle

Editor: Chris Schaller
cschaller@csbsju.edu

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CSB | SJU Chemistry
Ardolf Science Center
37 South College Ave.
St. Joseph, MN 56374

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Alum Notes

Loren Kaake Chem '03 is an Assistant Professor in the chemistry department at Simon Fraser University in British Columbia. After completing a Ph.D. at University of Minnesota in 2009, Kaake did post-doctoral work at University of Texas-Austin and University of California, Santa Barbara. His specialty is in the physical chemistry of optoelectronic materials.

Daryl Fields Bchm '10 has completed Ph.D. work as part of the M.D./Ph.D. program at the University of Wisconsin-Madison. As a result of this work, he and collaborators have applied for a patent for a drug to treat sleep apnea. Fields is now doing post-doctoral work at the University of

Check out the archive!
<http://employees.csbsju.edu/cschaller/cavendish/Cavendish.htm>

Florida. He will return to Madison to complete the M.D. program.

Redmond Fraser Chem '11 is working as a staff scientist in quality control at Cargill.

Felicia Burns Chem '11 is starting graduate school in organic chemistry at Syracuse University.

Moses Adeagbo Chem '12 has started graduate studies in computer science at the University of Minnesota.

Krista Barzen-Hanson Chem '13 has been awarded a fellowship from the National Science Foundation Graduate Research Fellowship Program. Barzen-Hanson is a graduate student at Oregon State University.

Transitions: Personnel Changes in Ardolf



Hutcheson (left) and Link

Two fixed-term faculty members, **Rachel Hutcheson** and **Jeff Link**, have accepted more permanent positions. Both opportunities represented a homecoming of sorts,

with Hutcheson moving back west and Link returning to New England. Hutcheson will be starting a tenure-track biochemistry faculty position at the University of Portland this fall. Link will be teaching chemistry, honors chemistry, and AP chemistry at Kents Hill School in Readfield, Maine. Kents Hill is a boarding prep school established in 1824, and was the first co-ed prep school in the nation.

Paola Forero Bello is the new Laboratory Manager / Instructor in chemistry. Forero Bello is responsible for overseeing all stockroom activities supporting the teaching and research laboratories. She will also be teaching some



Gibson (left) and Forero Bello

foundation labs. She earned a M.S. from Tennessee State University, where her research involved the analysis of biomaterials.

Brianne Gibson, Chem '15 accepted the new position of Stockroom Fellow and is responsible for assisting the laboratory manager with day-to-day stockroom operations.