

Letter from the Chair



Greetings to students, faculty, staff, and especially our alumni. First off, I hope this Newsletter finds you in good health. This is our 2nd year doing a Newsletter, and the 2019-2020 academic year was certainly newsworthy! We started off the year with our annual retreat, at which the VP for Research Ken Olliff hosted a reception to recognize our research productivity. We were joined by numerous members of the Research Office, Interim Dean Mike Lewis, and President Fred Pestello. We toasted the recent success of the department, where we saw faculty achieve record growth in federal research funding, with awards totaling \$5.7 million over the next five years (this is triple the amount received in 2016). The following Newslink article describes this in more detail as well as the faculty who received new grants this year: <https://www.slu.edu/news/2019/october/chemistry-research-success.php>. In addition, here is a separate article describing efforts around the American Chemical Society Project SEED (Summer Experiences for the Economically Disadvantaged) program at SLU, led by Dr. Ryan McCulla: <https://www.slu.edu/news/2019/september/chemistry-seed-program.php>.

The Fall semester was a big one, literally, with SLU enrolling its largest freshman class in history: <https://www.slu.edu/news/2019/august/record-freshman-class.php>. We had several new people join the faculty to help to educate these students including Dr. Rob Perkins, Dr. Sara Drenkhahn-Weinaug, Natalie Schleper, and John Throgmorton. Later in the fall semester, we marked a milestone in the construction of our new Interdisciplinary Science and Engineering (ISE) building with a topping-out ceremony: <https://www.slu.edu/news/2019/december/ise-building-topping-out.php>. The building is scheduled to be finished this summer, and it will house our freshman and sophomore teaching labs (Principles of Chemistry, General Chemistry, and Organic Chemistry), as well as Biochemistry lab and several faculty offices. Pictures of the teaching labs in the new building are two pages down in this newsletter. The vacated space in Monsanto will be turned into research labs. While the renovations are currently on-hold due to the uncertainty of the fall semester, we expect this space to be a big boost to our research activities.

Of course, more big news came in the Spring semester, with the COVID-19 pandemic causing universities across the US, including

(Continued on page 2)

this issue

Meet the Faculty	p. 3
Faculty News	p. 4
Faculty Publications	p. 6
New to the Department	p. 10
NMR Facility	p. 11
Department Awards	p. 12
Alumni Update	p. 15



HIGHLIGHTS

- New programs in Chemical Biology and Pharmacology are in full-swing
- New Interdisciplinary Science and Engineering Building offers first lab class during Summer 2020
- 167 undergraduate majors (23 graduating in 2020)
- 42 full-time graduate students (recently graduated 6 Ph.D. students)
- Marcus Award celebrates 50th anniversary
- High field NMR facility put to good use
- 33 publications last year

SLU, to move to on-line education. The last event I attended on-campus before the decision to move on-line was the annual Grantwinner reception put on by the Research Office. At that event, Prof. Jim Edwards received the senior faculty Outstanding Researcher Award and Prof. Istvan Kiss received the senior faculty Scholarly Works Award (for his group's paper in *Nature*). The following week (which was Spring Break), SLU announced the transition to on-line education. The faculty were given one week to move their lecture and lab courses to a distance learning format. I am extremely proud of the hard work and dedication that the faculty, staff, and graduate students did to ensure a successful educational experience for our students. This included faculty rushing to make on-line lectures and learning how to write on-line exams, graduate students making videos of labs and collecting data so that undergraduates could finish lab reports, and research groups doing on-line group meetings. The students, especially our majors, did a great job adapting and being understanding of the situation. Graduate students did their defenses on-line (via Zoom), with several approaching 50 attendees during their presentation. We wish we could have celebrated our graduates with our annual awards banquet and commencement ceremonies, but we are looking forward to when we can recognize them in the future with on-campus events. We were able to have our annual Marcus award competition (via Zoom), with five undergraduate researchers participating. Johan Carballo (Baum lab) was the winner, and this is the 50th year of the Marcus award competition.

Going on-line did not stop the good departmental news, which included Asmira Alagic receiving the Stauder Award for Excellence in Undergraduate Teaching (from the College of Arts and Sciences) and Jennifer Monahan being promoted to Associate Professor. In addition, two different chemistry faculty groups received separate KEEN Program Transformation Educational Grants, one group consisting of Asmira Alagic, Christy Bagwill, and Daria Sokic-Lazic and the other Rob Perkins and Brian Woods.

Things are starting to re-open on-campus. Chemistry research labs opened May 18th. We are teaching lectures on-line this summer, but we are teaching

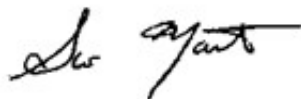
labs on-campus in July. We are planning for on-campus instruction this fall, but we will be doing so in a safe fashion with reduced capacities, lots of PPE, and social distancing. Melissa Hopfinger (former graduate student in the Znosko group) will be joining the faculty for the upcoming year to teach in the General Chemistry sequence. While I am sure the 2020-2021 academic year will be a challenge, there is also a lot of excitement with the move to the new building and just getting back to campus in the "new normal."

As we mentioned last year, for any alumni who want to come back to the Department for a visit, just send me or any faculty member you know an email, and we would be happy to show you around (including the new building) and have you meet some of our current students. We did have a former student, Dr. Doug Hammerstroem (BS and MS from our department, now at EAG labs), come back to give seminar this year. Our students enjoy seeing the career paths alumni have taken after leaving SLU. We are starting to do career panels with alumni as well (if you are interested in helping with that, please also let us know).

Finally, are you interested in helping to support the department? You can do so monetarily by going to this site: <https://www.slu.edu/alumni-and-donors/give/index.php>, clicking on "Make a Gift," and checking "Select the fund(s) for your gift." If you go under the heading of College of Arts and Sciences, you can select the Chemistry Development Fund, and those donations will go directly to our department. If you have specific ideas around donations, or if you want to help in other ways (such as working with students on resume review, etc.), feel free to contact the Department Chair (scott.martin@slu.edu).

Please let us know what you have been up to and if you have any news to share.

Best Wishes,



THE INTERDISCIPLINARY SCIENCE AND ENGINEERING BUILDING TEACHING LABS



Organic Chemistry



Biochemistry



General Chemistry



Principles of Chemistry

Meet the Faculty



Faculty

Asmira Alagic - Chemistry Education

Christopher Arnatt - Organic

Christy Bagwill - Organic Chemistry Education

Dana Baum - Biochemistry and Graduate Program Coordinator

Paul Bracher - Organic

Steven Buckner - Analytical

Sara Drenkhan-Weinaug - Instructor

James Edwards - Analytical

Paul Jelliss - Inorganic

Charles Kirkpatrick - Inorganic and Associate Department Chair

Istvan Kiss - Physical

Bruce Kowert - Physical

Piotr Mak - Physical

Scott Martin - Bioanalytical and Department Chair

Ryan McCulla - Organic

Marvin Meyers - Medicinal & Organic

Jennifer Monahan - Analytical

Jamie Neely - Inorganic

Robert Perkins - Chemistry Education

Natalie Scheleper - Instructor

Daria Sokic-Lazic - Chemistry Education

John Throgmorton - Instructor

Brian Woods - Chemistry Education

Brent Znosko - Biochemistry and Undergraduate Program Coordinator

Emeritus Faculty

Alexa Serfis

Staff

Mike Briscoe - Machinist and Glass Shop

Fahu He - NMR Lab Manager

Lauren Humphrey - Principles of Chemistry Laboratory Coordinator

Angela Jouglard - Post-Award Specialist II

Kimber Moscardelli - Assistant General Chemistry Lab Coordinator

Damon Osbourn - Instrument Lab Manager

Kevin Smith - Assistant Organic Chemistry Lab Coordinator

Shontae Williams - Administrative Assistant II

Faculty News

The faculty of Saint Louis University's Department of Chemistry are highly regarded in their fields. They are known for their extensive research across a diverse group of specialties that include the areas of analytical, biochemistry, inorganic, organic, and physical chemistry.

Asmira Alagic - At the end of Spring 2019, I ventured on a new service endeavor and started the STEM wellness initiative with the help of five undergraduate students. STEM wellness aims to help students beyond their academic capabilities—to help foster students' enthusiasm about their endeavors at SLU and beyond. We wanted to prevent feelings of solitude and hyper-competitiveness between peers in STEM fields by giving them a healthy environment to engage outside the classroom. To achieve our goal, we organized wellness and STEM career awareness events three days a week throughout the 2019-2020 school year. We offered Monday morning runs, mid-week yoga, and informal Friday coffee dates so students in similar fields could share their experiences while promoting their physical and mental health. We wrote multiple proposals and received funding to support our initiative. We are excited to continue the STEM wellness initiative at SLU for many years to come.

Chris Arnatt - The Arnatt lab has been busy transitioning to more molecular modeling due to COVID, and now, we are leveraging that knowledge to synthesize new compounds. We have also published our first two papers on our estrogen receptor gallstone work.

Christy Bagwill - This last year I taught Principles of Chemistry lecture, lab, and organic labs. It

was quite a busy year as we prepared for the transition to the new lab spaces in the Interdisciplinary Science and Engineering Building. As you can see by the pictures presented earlier in this Newsletter, the new labs are an amazing educational space with lots of opportunities for learning chemistry, development of new experiments, and incorporation of new instrumentation. We are excited to tell you more about it in the next edition of our Newsletter. Other than teaching, Daria Sokic-Lazic, Asmira Alagic, and I submitted a successfully funded KEEN proposal. Our current proposal builds on a previously funded grant where learning modules were developed to create value, curiosity, and make interdisciplinary connections with chemistry concepts. Going forward our focus will be to improve these modules and develop assessments and survey to assess the efficacy of using these modules in large freshman level chemistry lecture courses.

Paul Bracher - In 2019, the Bracher Group celebrated the graduation of its second Ph.D. student, Dr. Rio Febrian. Students in the group traveled to give presentations in Seattle (Astrobiology Science Conference), Chattanooga (Center for Chemical Evolution), and Kennesaw, Georgia. Our paper in *Nature Communications* on peptide synthesis and the origin of life is open access, free to read here: <https://t.co/ugqgddsZBv>.

You can follow our adventures on Twitter (@BracherLab). Former orgo students: if you have a spare moment, please e-mail Paul (paul.bracher@slu.edu) to let him know how you're doing.

Sara Drenkhahn-Weinaug - Dr. D joined the department in July of 2019 and has since then taken over the Principles of Chemistry Labs and taught PoC 1 lecture and General Chemistry 2. This summer, she has been working on the exciting task of moving the PoC, Gen Chem, Biochem, and Organic labs into the new ISE building. In addition, she has joined the quarantine puppy club and brought home Chewbacca, a light curly-coated golden retriever.

Istvan Kiss - With graduate student Yifan Liu, the Kiss group published a paper in *Nature* on "Braess's paradox and programmable behaviour in microfluidic networks" (<https://doi.org/10.1038/s41586-019-1701-6>), which was highlighted in a SLU *Newslink* article (<https://www.slu.edu/news/2019/november/mini-lab-on-a-chip.php>) and received the Scholarly Works Award of the Office of the Vice President for Research.

Dr. Kiss was also awarded the Students and Teachers as Research Scientists (STARS) Distinguished Service Award for 10-years of service as a mentor to students in the STARS program.

Piotr Mak - The differences in ligand affinity between HbA molecules enclosed within red blood cells (RBCs) and these in free isolated states were intriguing scientists for some time. The structure-function relationship studies of proteins inside living cells, however, are complicated because there are no reliable structural probes of protein conformation *in vivo*. In our recent

(Continued on page 6)

studies, we applied, for the first time, resonance Raman spectroscopy to study the protein structure inside living RBC. Our studies revealed changes in the orientation of the heme vinyl groups, which might affect the heme redox potential, which in turn can be responsible for observed discrepancies in HbA activity.

Scott Martin – The Martin Research group had a departure and a few new arrivals this year. In the summer of 2019, Dr. Alexandra (Harrison) Townsend successfully defended her Ph.D., with her last paper being on the cover of *Electroanalysis*. She is now employed at Millipore-Sigma. In July, Emily Currens joined the group, and she already is co-author on her first paper in the *Analyst*. In January, another new graduate student, Major Selemani, came on-board. He joins Beth Hayter (finishing her 3rd year, having passed comps), Logan Robart (finishing his 2nd year), and Alesia Gjoni (undergraduate student) in the group. In July, Dr. Andre Castiaux (current post-doc) will be transitioning into a different role as SLU, acting as Lead Engineer for our new SLU Center for Additive Manufacturing (<https://www.slu.edu/news/2020/february/slu-cam.php>). We will still be working with Andre and the Center's new (and impressive) 3D printers. The group did a great job managing the COVID situation. We had weekly group meetings via Zoom, where we alternated research updates, lit reviews, and background talks to keep everyone's mind on research. I am impressed with their positive attitude and ability to get their research back up and going.

Ryan McCulla - The McCulla group continues to focus on

photodeoxygenation reactions and the effect of these reactions on biological systems. In 2019, John Petroff II finished his Ph.D. and took a postdoctoral research position at Washington University School of Medicine in the Anesthesiology Department. Satyanarayana Murthy Chintala received a dissertation fellowship, and Prof. McCulla received the Donald G. Brennan Award for Excellence in Graduate Mentoring.

Marvin Meyers - Our lab continues to focus on discovery of potential drugs for infectious diseases. Last year we welcomed Dr. Makafui Gasonoo as a new postdoc in the lab and said goodbye to postdoc Dr. Haresh Thakellapalli who took a position as a research scientist at Avisyn working in the drug research labs at Pfizer. We received two grants from the NIH to fund our growing project collaboration to discover potential drugs to treat *Cryptosporidiosis*, a leading cause of infectious diarrhea in children in the developing world. This spring three seniors graduated from the lab: Clayton Monia and Carlos Kamal are working towards medical school, and Brylon Denman will be attending graduate school in chemistry at the University of Minnesota.

Natalie Schleper—Natalie spent the year teaching General Chemistry 1 and 2 recitations and Basic Chemistry. She redesigned the worksheets used for the general chemistry recitation courses. The worksheets now consist of example problems and two-three practice problems per topic. She is implementing new strategies such as example problem videos and incorporating participation points to encourage involvement in the course so that more students can benefit from the additional resources. She will continue researching the best

ways improve student learning and participation.

Daria Sokic-Lazic - Daria Sokic-Lazic is responsible for the General Chemistry Laboratories. This past year, she has spent most of her time planning for the exciting move to the new ISE building. After lots of hard work and help from many different individuals, the general chemistry laboratories were ready just in time for the new incoming freshman class. The entire General Chemistry Lab teaching team is looking forward to inspiring our new students in the new state of the art science building.

Brent Znosko – Dr. Znosko continues to teach biochemistry courses, run a research lab investigating the stability and structure of nucleic acids, and serve as the department's undergraduate program coordinator. In the spring of 2019, Dr. Katie Richardson successfully defended her thesis. In July, Bree Bozsoki and Megan Rudolphi joined the group. They joined graduate students Miranda Adams, Melissa Hopfinger, and Sharear Saon in the group. In 2019, we published four articles, with an additional article accepted for publication. The lab's research was cited 62 times in 2019, including in review articles published in *RNA Biology*, *Seminars in Cell and Developmental Biology*, *Biochimie*, and *RNA Recognition*. Dr. Znosko gave seminar at Webster and Truman State Universities. Several members of the lab attended the RNA Corbett meeting in Columbia, MO. When he's not working, Dr. Znosko is watching his boys play baseball, basketball, football, flag football, soccer, and martial arts.

FACULTY PUBLICATIONS

Alagic

Monahan, Jennifer and Alagic, Asmira. (2019) Comparing Spectroscopic Techniques, Analytical Sciences Digital Library [Online] Active Learning Curricular Materials: Shorter Activities, #129.

Arnatt

DeLeon, C.; Wang, H.H.; Gunn, J.; Wilhelm, M.; Cole, A.; Arnett, S.; Wang, D. QH.; Arnatt, C.K. (2020) A novel GPER antagonist protects against the formation of estrogen-induced cholesterol gallstones in female mice. *Journal of Lipid Research*. 61(5): 767-777.

Wang, H.H.; Bari O.; Arnatt, C.K.; Liu, M.; Portincasa, P.; Wang, D. QH. (2020) Activation of a novel estrogen receptor GPR30 enhances cholesterol cholelithogenesis in female mice. *Hepatology*.

Petroff, J.T.; Grady, S.; Arnatt, C.K.; McCulla, R.D. (2020) Dibenzothiophene Sulfone derivatives as plasma membrane dyes. *Photochemistry and Photobiology*. 96 (1): 67-73 .

Bracher

Campbell, T.D.; Febrian, R.; McCarthy, J.T.; Kleinschmidt, H.E.; Forsythe, J.G.; Bracher, P.J. (2019) Prebiotic Condensation Through Wet-Dry Cycling Regulated by Deliquescence. *Nat. Commun.*, 10, No. 4508.

Campbell, T.D.; Febrian, R.; Kleinschmidt, H.E.; Smith, K.A.; Bracher, P.J. (2019) Quantitative Analysis of Glycine Oligomerization by Ion-Pair Chromatography. *ACS Omega*, 4, 12745-12752.

Buckner

Laktas, J.; Stochl, I.; Buckner, S.W.; Chung, S.W.; Buckner, M.I.W.; Jelliss, P.A. "Energetic Nanoparticle", US Prov. Pat App No 62/724,050.

Buckner, S.W.; Laktas, J.; Chung, S.W.; Buckner, S.W.; Jelliss, P.A.; Place, G. "A Novel Nanocomposite for Combustion Applications" (nMx12-18); US Patent 10,519,067.

Laktas, J.; Chung, S.W.; Buckner, S.W.; Jelliss, P.A.; Place, G.; Becksted, A.M. "Nanoparticle Composite as a Hybrid or Solid Fuel Grain"; US Patent 10,501,385

Buckner, S.W.; Laktas, J.; Chung, S.W.; Jelliss, P.A.; Place, G. "Method for Making A Novel Nanocomposite for Combustion Applications"; US Patent 10,494,315.

Buckner, S.W.; Laktas, J. Chung, S.W.; Jelliss, P.A.; Place, G.; "A Novel Nanocomposite for Combustion Applications" (Thermites); US Patent 10,173,945

Lawrence, A.R.; Laktas, J.M.; Place, G.J.; Jelliss, P.A.; Buckner, S.W.; Sippel, T.R.; "Organically-capped, nanoscale alkali metal hydride and aluminum particles as solid propellant additives", *J. Propulsion and Power*, **35**, 736-746 (2019).

Zeng, W.; Nyapete, C.O.; Benziger, A.H.H.; Jelliss, P.A.; Buckner, S.W.; "Encapsulation of Reactive Nanoparticles of Aluminum, Magnesium, Zinc, Titanium, or Boron within Polymers for Energetic Applications", *Current Applied Polymer Science*, **3**, 1-11 (2019).

(Continued on page 8)

Jelliss

Laktas, J.; Stochl, I.; Buckner, S.W.; Chung, S.W.; Buckner, M.I.W.; Jelliss, P.A.; “Energetic Nanoparticle”, US Prov. Pat App No 62/724,050.

Buckner, S.W.; Laktas, J.; Chung, S.W.; Buckner, S.W.; Jelliss, P.A.; Place, G.; “A Novel Nanocomposite for Combustion Applications” (nMx12-18); US Patent 10,519,067.

Laktas, J.; Chung, S.W.; Buckner, S.W.; Jelliss, P.A.; Place, G.; Becksted, A.M.; “Nanoparticle Composite as a Hybrid or Solid Fuel Grain”; US Patent 10,501,385

Buckner, S.W.; Laktas, J.; Chung, S.W.; Jelliss, P.A.; Place, G.; “Method for Making A Novel Nanocomposite for Combustion Applications”; US Patent 10,494,315.

Buckner, S.W.; Laktas, J.; Chung, S.W.; Jelliss, P.A.; Place, G.; “A Novel Nanocomposite for Combustion Applications” (Thermites); US Patent 10,173,945

Lawrence, A.R.; Laktas, J.M.; Place, G.J.; Jelliss, P.A.; Buckner, S.W.; Sippel, T.R.; “Organically-capped, nanoscale alkali metal hydride and aluminum particles as solid propellant additives”, *J. Propulsion and Power*, **35**, 736-746 (2019).

Zeng, W.; Nyapete, C.O.; Benziger, A.H.H.; Jelliss, P.A.; Buckner, S.W.; “Encapsulation of Reactive Nanoparticles of Aluminum, Magnesium, Zinc, Titanium, or Boron within Polymers for Energetic Applications”, *Current Applied Polymer Science*, **3**, 1-11 (2019).

Kirkpatrick

Identification and Characterization of New RNA Tetraloop Sequence Families. Richardson, Katherine E.; Adams, Miranda S.; Kirkpatrick, Charles C.; Gohara, David W.; Znosko, Brent M. *Biochemistry* (2019), **58**(48), 4809-4820.

database of secondary structure motifs in RNA three-dimensional structures. Richardson, Katherine E.; Kirkpatrick, Charles C.; Znosko, Brent M. *Database* (2020), baz153.

Use of HPLC retention to investigate new P descriptors designed to represent ion- π interactions. Bagwill, Christina S.; Wireduaah, Selina; Cusworth, Brian; Korba, Joshua; Kirkpatrick, Charles C.; Lewis, Michael; Stalcup, Apryll M. *Journal of Liquid Chromatography & Related Technologies* (2020), **43**(3-4), 83-93.

Kiss

Sebek M, Kawamura Y, Nott AM, Kiss IZ (2019) Anti-phase collective synchronization with intrinsic in-phase coupling of two groups of electrochemical oscillators. *Philos Transact A Math Phys Eng Sci* **377**(2160):20190095–15.

Case DJ, Liu Y, Kiss IZ, Angilella J-RXG, Motter AE (2019) Braess’s paradox and programmable behaviour in microfluidic networks. *Nature* **8**:1–9.

Sebek M, Kiss IZ (2019) Plasticity facilitates pattern selection of networks of chemical oscillations. *Chaos* **29**(8):083117.

Ocampo-Espindola JL, Bick C, Kiss IZ (2019) Weak Chimeras in Modular Electrochemical Oscillator Networks. *Front Appl Math Stat* **5** (38):doi: 10.3389-fams.2019.00038.

Liu Y, Kiss IZ (2019) Localization of current oscillations and synchronization patterns in microchip-based dual electrode flow cell without resistance balancing. *Eur Phys J Spec Top* **227** (18):2659–2673.

Zou W, et al. (2019) Quenching and revival of oscillations induced by coupling through adaptive variables. *Phys Rev E* **99**(3-1):032214.

Hankins MJ, Gáspár V, Kiss IZ (2019) Abrupt and gradual onset of synchronized oscillations due to dynamical quorum sensing in the single-cathode multi-anode nickel electrodisolution system. *Chaos* **29**(3):033114.

Kowert

B. A. Kowert *Journal of Physical Chemistry B*, 2020, 124, 3716-3723. "Diffusion of Polymethylene Chain Molecules in Nonpolar Solvents.

Mak

Atifi, A.; Mak. P. J.; Ryan, M. D. "Proton-Coupled Reduction of an Iron Nitrosyl Porphyrin in the Protic Ionic Liquid Nanodomain," *Electrochim. Acta*, 2019, 295,735-741.

Martin

B.T. Mehl and R.S. Martin, "Integrating 3D cell culture of PC12 cells with microchip-based electrochemical detection," *Analytical Methods*, 2019,11, 1064-1072.

A.D. Townsend, R. S. Sprague, and R.S. Martin, "Microfluidic Device Using a Gold Pillar Array and Integrated Electrodes for On-chip Endothelial Cell Immobilization, Direct RBC Contact, and Amperometric Detection of Nitric Oxide," *Electroanalysis*, 2019, 31, 1409–1415.

A. D. Castiaux, C. W. Pinger, E. A. Hayter, M. E. Bunn, R. S. Martin and D. M. Spence, "PolyJet 3D-Printed Enclosed Microfluidic Channels without Photocurable Supports," *Analytical Chemistry*, 2019, 91, 6910-6917.

A.D. Castiaux, D. M. Spence, R.S. Martin, "Review of 3D cell culture with analysis in microfluidic systems," *Analytical Methods* 2019, 11, 4220-4232.

McCulla

Chintala, S. M. ; Petroff, J. T.; Barnes, A.; McCulla,R. D. (2019) "Photodeoxygenation of phenanthro[4,5-bcd]thiophene S-oxide, triphenyleno[1,12-bcd]thiophene S-oxide and perylo[1,12-bcd]thiophene S-oxide." *Journal of Sulfur Chemistry*, 40(5), 503-515.

Omlid, S. M.; Dergunov, S. A.; Isor, A. A.;

Sulkowski, K. L.; Petroff, J. T.; Pinkhassik, E.; McCulla R. D. (2019) "Evidence for diffusing atomic oxygen uncovered by separating reactants with a semi-permeable nanocapsule barrier." *Chemical Communications*, 55 (12), 1706-1709 (Cover Article)

Meyers

Harrison GA, Mayer Bridwell AE, Singh M, Jayaraman K, Weiss LA, Kinsella RL, Aneke JS, Flentie K, Schene ME, Gaggioli M, Solomon SD, Wildman SA, Meyers MJ, Stallings CL*. Identification of 4-Amino-Thieno[2,3-d] Pyrimidines as QcrB Inhibitors in Mycobacterium tuberculosis. *mSphere* 2019, 4, e00606-19; DOI: 10.1128/mSphere.00606-19.

Oliva J, Galasinski S, Richey A, Campbell AE, Meyers MJ, Modi N, Zhong JW, Tawil R, Tapscott SJ, Sverdrup FM*. Clinically Advanced p38 Inhibitors Suppress DUX4 Expression in Cellular and Animal Models of Facioscapulohumeral Muscular Dystrophy. *J. Pharmacol. Exp. Ther.* 2019, 370, 219-230. doi: 10.1124/jpet.119.259663.

Meyers MJ*, Liu J, Liu Z, Ma H, Dai L, Adah D, Zhao S, Li X, Liu X, Lu Y, Huang Y, Tu Z, Chen X, Tortorella MD*. 4-Aryl Pyrrolidines as Novel Orally Efficacious Antimalarial Agents. Part 2: 2-Aryl-N-(4-arylpyrrolidin-3-yl)acetamides. *ACS Med. Chem. Lett.* 2019, 10, 966-971. doi: 10.1021/acsmchemlett.9b00123.

Karpova D, Rettig MP, Ritchey J, Cancilla D, Christ S, Gehrs L, Chendamarai E, Evbuomwan MO, Holt M, Zhang J, Abou-Ezzi G, Celik H, Wiercinska E, Yang W, Gao F, Eissenberg LG, Heier RF, Arnett SD, Meyers MJ, Prinsen MJ, Griggs DW, Trumpp A, Ruminski PG, Morrow DM, Bonig HB, Link DC, DiPersio JF*. Targeting VLA4 integrin and CXCR2 mobilizes serially repopulating hematopoietic stem cells. *J. Clin. Invest.* 2019, 130, 2745-2759. doi: 10.1172/JCI124738.

Meyers MJ*, Liu J, Xu J, Leng F, Guan J, Liu Z, McNitt SA, Qin L, Dai L, Ma H, Adah D, Zhao S, Li X, Polino AJ, Nasamu AS, Goldberg DE, Liu X, Lu Y, Tu Z, Chen X, Tortorella MD*. 4-Aryl

Pyrrolidines as a Novel Class of Orally Efficacious Antimalarial Agents. Part 1: Evaluation of 4-Aryl-N-benzylpyrrolidine-3-carboxamides. *J. Med. Chem.* 2019, *62*, 3503-3512.

Xu P, Ganaie SS, Wang X, Wang Z, Kleiboeker S, Horton NC, Heier RF, Meyers MJ, Tavis JE, Qiu J*. Endonuclease Activity Inhibition of the NS1 Protein of Parvovirus B19 as a Novel Target for Antiviral Drug Development. *Antimicrob. Agents Chemother.* 2019, *63*, e01879-18. doi: 10.1128/AAC.01879-18.

Monahan

Monahan, Jennifer and Coulton, John B. (2019) Choosing the Right Graph, Analytical Sciences Digital Library [Online] Active Learning Curricular Materials: Shorter Activities, #6.

Monahan, Jennifer and Alagic, Asmira. (2019) Comparing Spectroscopic Techniques, Analytical Sciences Digital Library [Online] Active Learning Curricular Materials: Shorter Activities, #129.

Osbourn

Edwards, R.L., Heueck, I., Lee, S.G., Shah, I.T., Miller, J.J., Jezewski, A.J., Mikati, M.O., Wang, X., Brothers, R.C., Heidel, K.M., Osbourn, D.M., Burnham, C.D., Alvarez, S., Fritz, S.A., Dowd, C.S., Jez, J.M., Odom-John, A.R. "Potent, specific MEPicides for treatment of zoonotic staphylococci," *PLOS Pathogens*, 2020, 16 (6), <https://doi.org/10.1371/journal.ppat.1007806>.

Sangun, L., Ginese, M., Girouard, D., Beamer, G., Huston, C.D., Osbourn, D.M., and Griggs, D.W., Tzipori, S. "Piperazine-Derivative Mmv665917: An Effective Drug in the Diarrheic Piglet Model of Cryptosporidium Hominis," *Journal of Infectious Diseases*, 2019, 220, 285-293, <https://doi.org/10.1093/infdis/jiz105>.

Perkins

Allais, C.; Hansen, E.C.; Ide, N.D.; Perkins, R.J.; Swift, E.E. (2020) "Selected free radical reactions" in Practical Synthetic Organic Chemistry: Reactions, Principles, and Techniques, 2nd Ed. Caron, S. John Wiley and Sons, Hoboken, NJ,

USA.

Brown Rippin, D.H.; Hansen, E.C.; Perkins, R.J.. (2020) "Oxidations" in Practical Synthetic Organic Chemistry: Reactions, Principles, and Techniques, 2nd Ed. Caron, S. John Wiley and Sons, Hoboken, NJ, USA.

Perkins, R.J.; Hughes, A.J.; Hansen, E.C. (2019) Metal reductant-free electrochemical nickel-catalyzed couplings of aryl and alkyl bromides in acetonitrile," *Org. Process Dev. Rev.* 23, 1746-1751.

Perkins, R.J.; Feng, R.; Lu, Q.; Moeller, K. D. (2019) Anodic cyclizations, seven-membered rings, and the choice of radical cation versus radical pathways, *Chin. J. Chem.* 37, 672-678.

Znosko

Lisowiec-Wachnicka, J., Znosko, B. M., and Pasternak, A. (2019) Contribution of 3'T and 3'TT overhangs to the thermodynamic stability of model siRNA duplexes, *Biophys. Chem.* 246, 35-39.

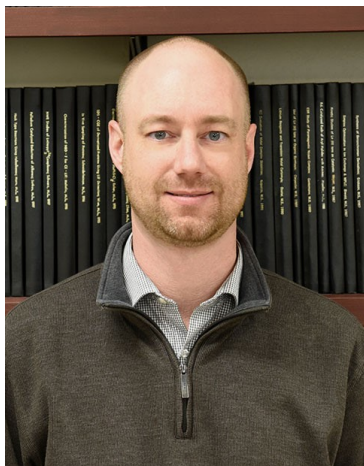
Adams, M. S. and Znosko, B. M. (2019) Thermodynamic characterization and nearest neighbor parameters for RNA duplexes under molecular crowding conditions, *Nucleic Acids Res.* 47, 3658-3666.

Ferreira, I., Jolley, E. A., Znosko, B. M., and Weber, G. (2019) Replacing salt correction factors with optimized RNA nearest neighbor enthalpy and entropy parameters, *Chem. Phys.* 521, 69-76.

Richardson, K. E., Adams, M. S., Kirkpatrick, C. C., Gohara, D. W., and Znosko, B. M. (2019) Identification and characterization of new RNA tetraloop sequence families, *Biochemistry* 58, 4809-4820.

New to the Department of Chemistry

Chemical Biology and Pharmacology Program



Prof. Marv Meyeres
Associate Professor - Chemistry
Director - Chemical Biology Program

The Chemical Biology program got off to a great start in the Summer of 2019, the first year of the program. This program is designed to provide a multi-disciplinary degree for those interested in the application of chemistry towards solving problems in biology with students taking course work and conducting research in the College of Arts & Sciences as well as the School of Medicine. Three students enrolled in the Master's degree program and joined research groups

in the Departments of Chemistry, Biochemistry, and Pharmacology & Physiology. On the undergraduate side, we currently have ~25 students majoring in Chemical Biology & Pharmacology (BS) with a fairly even spread across the freshman, sophomore, and junior classes. Next year, we will graduate our first BS and MS students. For more information about this program, visit <https://www.slu.edu/arts-and-sciences/academics/degrees/undergraduate/chemical-biology-pharmacology.php>.

NMR FACILITY

Maybe not all of you know that we have two NMR spectrometers, a Bruker 400 MHz AVANCE III Micro Bay located in Monsanto Hall, Room 21 (pictured on right) and a Bruker 700 MHz AVANCE III HD located in Shannon Hall, Room 8 (pictured on next page). The new 700 MHz spectrometer is equipped with a QCI cryoprobe which was specially designed for us. It has the capability to observe ^1H , ^{13}C , ^{15}N , ^{19}F , and ^{31}P nuclei and can work at temperatures between $-40\text{ }^\circ\text{C}$ and $80\text{ }^\circ\text{C}$. This QCI cryoprobe increases sensitivity by about 330% compared to the room temperature TXI probe. The higher field also improves NMR sensitivity, i.e. 700 MHz spectrometer will get ~2.3 times higher signal compared to the 400 MHz spectrometer. Both the cryoprobe and higher field of our 700 MHz spectrometer makes it suitable not only for

traditional small molecule/natural products structure elucidation but also for biomolecular NMR including peptide, protein, nucleic acid studies on structure, dynamics, and interactions.



(Continued on page 12)

High Field NMR Projects in Department of Chemistry

Two research groups in our department have utilized the high field NMR facility for their bio-molecular projects.

Arnatt Lab: The C-peptide project studies the interactions of C-peptide with its target binding protein by NMR spectroscopy.

Znosko Lab: One project is attempting to elucidate the 3D structure of an RNA tetraloop, and another project is investigating the conformation of a DNA-intercalator complex.

Several research labs have used the 700 MHz spectrometer to tackle their difficult problems for small molecule structure elucidation.

For more detailed information about our NMR facility, please visit the Department of Chemistry web page: <https://www.slu.edu/arts-and-sciences/chemistry/student-resources/facilities.php>.



Department Awards

James D. Collins Award for Excellence in Student Academic Achievement

This award is given to a senior that has demonstrated outstanding work in the major. Each department in the college awards a winner.

CRC Press Chemistry Achievement Award

This award recognizes outstanding academic performance by a senior chemistry or biochemistry major.

Royal Society of Chemistry Certificate of Excellence

The purpose of this award is to recognize outstanding achievement in the study of chemical science, given to a senior every year.

American Institute of Chemists Student Award

The purpose of this award is to recognize an outstanding chemistry/biochemistry student in their fourth year of studies.

Upperclassman Chemistry Scholarship

Also called the Gimenez scholarship, named after the former Vice-President at Sigma-Aldrich (now Millipore Sigma). Dr. Gimenez established this scholarship four years ago, and it is given to a rising junior and senior chemistry major who intend to work in the chemistry field.

St. Louis Rubber Group Scholarship

The Rubber Group Scholarship is awarded to a chemistry or biochemistry major entering their junior or senior year.

Vincent Spaziano Memorial Scholarship

This scholarship honors the long-time member of the department and former chair, Dr. Vince Spaziano. The recipient selected is a student who demonstrated outstanding performance in organic chemistry that year.

Hugh B. Donahoe Award in Organic Chemistry

This award is given in honor of a former faculty member for 20 years, Dr. Donahoe. This award is given to a sophomore major who has displayed outstanding performance on a special organic chemistry exam.

Saint Louis Section American Chemical Society Outstanding Junior Chemistry Award

This award is for an outstanding student in their third year of studies. A certificate is awarded and the winner's name is engraved on a plaque displayed in the front of Monsanto Hall.

American Chemical Society Awards

Awarded to a student who has demonstrated excellence in the selected field of chemistry based on a combination of research and coursework.

The winner is determined by performance in that course and approved jointly by the chemistry faculty of that specialty in the department.

Gamma Sigma Epsilon Members

National chemistry honor society founded in 1919 at Davidson College that was created to promote academic excellence and undergraduate research scholarship in chemistry.

Outstanding Freshman Chemistry Student

Awarded to a freshman chemistry major who has displayed outstanding performance in the general chemistry sequence.

Leopold Marcus Award for Outstanding Achievement in Undergraduate Research

The Leopold Marcus Award has played a central role in the Department of Chemistry's undergraduate research program since 1971. 2020 marked the 50th anniversary of the award and, once again, showcased the research senior chemistry and biochemistry students. The winner was Johann Carballo, who worked with Dr. Dana Baum. The other participants were Brittany Wichman (Dr. Paul Bracher), Emily Duncan (Dr. Chris Arnatt), Brylon Denman (Dr. Marv Meyers), and Arjun Bagai (Dr. Brent Znosko).

The award was established by Mr. Jack Marcus, owner and founder of Missouri Analytical Laboratories, and his wife, Gertrude, in honor of his father, Leopold Marcus. The purpose of the award is to encourage high-level achievement in chemistry at the undergraduate level. The competition is open to seniors majoring in chemistry and biochemistry doing research in the Saint Louis University chemistry department under the supervision of a faculty member. The winner of the competition, determined by a ballot of the judges who evaluate the entrants' presentations, receives a cash award and a certificate of achievement.

The award originated when Jack Marcus hired Richard Komoroski, a Saint Louis University undergraduate chemistry major to work at Missouri Analytical Laboratories. Mr. Marcus was impressed with what Richard knew and could do compared to what was possible when Mr. Marcus was an undergraduate. He thought this should be brought to the attention of the St. Louis chemical community and worked with Dr. Tom Layloff, a SLU chemistry faculty member at the time, to establish the award. Layloff was active in the St. Louis Section of the American Chemical Society, and the original sponsors of the award were the St. Louis Section and the SLU chemistry department. Mr. Marcus made a donation that provided the prize money. In the ensuing years, SLU chemistry took over sole sponsorship of the award. Dr. Bruce Kowert was in charge of the Marcus Award for ~30 years.

The award has evolved as methods of presenting

chemical research have evolved. For many years, the students gave oral presentations. More recently, posters were given as part of the chemistry department's Spring Awards Banquet program. This year, because of the Covid-19 pandemic, they gave online presentations.

The award's first winner even had a chemical name, Walter Boron. After graduating from SLU, he earned his Ph.D. and his M.D. degrees from the Washington University School of Medicine and has had a truly distinguished career. He is currently the David and Inez Myers/Antonio Scarpa Professor and chairman of the Department of Physiology and Biophysics at Case Western University. From 1980-2007, he was a member of the faculty at Yale University. He returned to SLU in 1995 to give the featured address at the dinner held in honor of the award's 25th anniversary. Boron is the former editor-in-chief of two leading physiology journals, *Physiological Reviews* and *Physiology* and was named to the National Academy of Medicine in 2014.

Richard Komoroski, the SLU student whose work led to the inception of the award, also has done well. After getting his B.S. in Chemistry in 1969, he obtained a Ph.D. in Physical Chemistry from Indiana University in 1973 and did postdoctoral research at Florida State University from 1973-1976. He was then the Director of the Biomedical NMR Center at the University of Arkansas for Medical Sciences. He currently is Research Professor of Psychiatry & Behavioral Neuroscience and Biomedical Engineering and Associate Director in the Center for Imaging Research in the Department of Psychiatry and Behavioral Neuroscience at the University of Cincinnati

2019 – 2020

Department Awardees

PhD Awards

Winner	Award
Katie Sanders	Carol M. and Joseph R. Franks Graduate Award in Chemistry
Murthy Chintala	CRC Press Chemistry Achievement Award
Miranda Adams	Royal Society of Chemistry Certificate of Excellence
Chelsea DeLeon	American Institute of Chemists Student Award

MS Awards

Winner	Award
Michael Armbruster	CRC Press Chemistry Achievement Award
Mohammad Kader	Royal Society of Chemistry Certificate of Excellence
Scott Grady	American Institute of Chemists Student Award

Senior Awards

Winner	Award
Sravya Ainapurapu	James D. Collins Award for Student Excellence
Emily Duncan	CRC Press Chemistry Achievement Award
Brittany Wichman	Royal Society of Chemistry Certificate of Excellence
Brylon Denman	American Institute of Chemists Student Award
Sravya Ainapurapu	Senior Legacy Symposium
Emily Duncan	Senior Legacy Symposium
Brittany Wichman	Senior Legacy Symposium

Junior Award

Winner	Award
Roe Dar	ACS Outstanding Junior Chemistry Award

Additional Awards

Winner	Award
Brittany Wichman	ACS Division of Organic Chemistry Undergraduate Award
Hayden Snyders	ACS Undergraduate Award in Analytical Chemistry
Sravya Ainapurapu	ACS Undergraduate Award in Physical Chemistry
Brylon Denman	ACS Division of Inorganic Chemistry Undergraduate Award
Joshua Shultz	Outstanding Freshman Chemistry Student
Aaron Burroughs	Hugh B. Donahue Award for Excellence and Achievement
Johan Carballo	Marcus Award Winner

Commendable Award to the SLUE ACS Student Chapter

Additional Awards

Dr. Jim Edwards	Senior Faculty Grant Winner
Dr. Asmira Alagic	William V. Stauder, S.J. Award for Excellence in Undergraduate Teaching in the Natural Sciences
Michael Green	LU Chemistry Department Teaching Award
Jack Samuelian	SLU Chemistry Department Teaching Award
Miranda Adams	ACS Division of Biological Chemistry Travel Grant
Johan Carballo	1 st Place Prize at St. Louis ACS Undergrad Research Symposium
Brylon Denman	3 rd Place Prize at St. Louis ACS Undergrad Research Symposium
Jack Samuelian	Poster award at the 2019 CornBelt Regional RNA Meeting

Gamma Sigma Epsilon Inductees:

Arjun Bagai
Caitlin Salloum
Ted Sananikone
Alice Yu
Anna Young

Alumni Update

Last year's newsletter can be found here: <https://www.slu.edu/arts-and-sciences/chemistry/pdfs/newsletter-jun2019.pdf>

We would love to hear from you. Please fill out this brief form here:
http://chemistry.slu.edu/newsletter_alumni