

SOME FEATURES IN IN THIS ISSUE:

- 2017-2018 Arnold C. Ott Lectureship in Chemistry
- Faculty & Staff Awards
- Annual Student Awards
- Supporting the Chemistry Department
- Instrumentation Update
- Senior Parting Shots
- Alumni Spotlight
- Student Scholars Day 2018
- Faculty Colloquia
- Faculty News & Research Highlights

Editors:

Andrew Korich
David Leonard
Laurie Witucki

Layout:

Jennifer Glaab

Chemistry Department
312 Padnos Hall
www.gvsu.edu/chem
chmdept@gvsu.edu

A Word from the Chairs

I am now writing to you as the *former* chair of the Department of Chemistry. In fall 2017 the College of Liberal Arts and Sciences announced that it was in need of a new Assistant Dean for Research, Facilities Planning, and High Impact Practices. In January 2018 I left my post as department chair after 4 ½ years and took this new position in the Dean's office. The new post is half-time, just as the department chair position was, so my contributions to teaching and research in Chemistry are continuing as before.

I very much enjoyed my time as chair and feel privileged to have served such an effective, collegial, and well-functioning department. I am especially grateful for the support I received from our expert front-office staff, Jennifer Glaab, Janet VanRhee, and Michelle DeWitt, and from our Associate Chairs Blair Miller, Chris Lawrence, and Debbie Herrington.

Despite some slowing in our growth – 2010/11 was the first academic year since 1990 that we did not make at least one tenure-track faculty hire – the department now has a nice distribution of experience and a deep bench of leadership. I am particularly encouraged by the seven young regular faculty we have recruited since 2010, all of whom are still with us. Jessica VandenPlas, Andrew Korich, Richard Lord, Paul Cook, Scott Thorgaard, Laura Hawk, and Brittland DeKorver have brought energy, ideas, and dedication that will serve GVSU students well for a long time.

I am also very happy that Debbie Herrington agreed to fill the role of department chair. Debbie is a remarkably effective teacher, scholar, and leader. Several years ago she won the Niemeyer award, GVSU's highest honor for a faculty member, and recently she was named Michigan Distinguished Professor of the Year. She has consistently displayed a high standard in all her activities and she has already demonstrated in her first few months as chair that she will be an inspiring leader. Please do whatever you can to support her!

As the new chair of Department of Chemistry I figured I should introduce myself to those of you who do not know me. I was hired at GVSU in 2003 after receiving my Ph.D. in Chemistry Education from Purdue University. I feel very fortunate to work in a department that values chemistry education research (CER) and has provided me with several wonderful CER colleagues; the largest group in the country. In 2014, I stepped into the newly created position of Associate Chair for Student Affairs with the goal of working to improve student advising and support in the Chemistry Department. As I now begin my new role as chair of the Department of Chemistry, I am grateful to be working with so many chemistry faculty who themselves are leaders at GVSU and beyond.

You have already heard from George McBane that he has taken on the role of Assistant Dean in the College of Liberal Arts and Sciences (CLAS); however, there are many other faculty in the Chemistry Department who currently hold leadership positions across campus and regionally.

- John Bender is the chair of the Equity and Inclusion Committee
- Shannon Biros is the chair of the CLAS Faculty Development Committee
- Matthew Hart is chair of the Pew Faculty Teaching and Learning Advisory Committee
- Andrew Lantz is the chair of the University Faculty Facilities Planning Advisory Committee (FFPAC)
- Richard Lord is the chair for the Western Michigan Section of the American Chemical Society

George McBane



- Felix Ngassa is the chair of the University Academic Senate and of the Executive Committee of the Senate
- Tom Pentecost is a Faculty Fellow and Director of Part-time Faculty Support in the Pew FTLC
- Rachel Powers is chair of the Undergraduate Research Council
- Jessica VandenPlas is the Faculty Director of the Women in Science and Engineering (WISE) community.
- Randy Winchester is chair elect for the Western Michigan Section of the American Chemical Society

Additionally, two of our chemistry colleagues have taken on full time GVSU leadership positions.

- Robert Smart is the Vice Provost for Research Administration and Executive Director for the Center for Scholarly and Creative Excellence
- Sherril Soman is the interim Dean of the College of Education and prior to that was GVSU's Registrar

Not to mention the fact that the Director of the PEW Faculty Teaching and Learning Center (Christine Rener) and GVSU's President (Thomas Haas or T. Haas to our students) are both chemists! Of course, these are our

chemistry faculty members who currently hold leadership positions. Many more chemistry faculty members have previously held leadership positions across campus and have helped to establish the Chemistry Department as one that is constantly working towards making GVSU a better place for our students, faculty, and staff.

In recognizing leadership, it is fitting to make special recognition of one of the longest standing members of the Chemistry Department and a former Chemistry Department Chair, Harvey Nikkel, as he prepares to retire. Those of you who know Harvey know that he has always been a strong supporter of chemistry students, faculty, and staff. Harvey was Department Chair from 1990-2004 during which time we saw a lot of growth and many new faculty, myself included, hired. Harvey continues to serve the Department and our students, most recently as the coordinator for our CHM 230 (organic and biochemistry) and CHM 232 (biochemistry) labs. We certainly wish him all the best as he leaves us at the end of this year to start a new chapter in his life, but he will be greatly missed. For those of you who knew Dr. Nikkel during your time at GVSU, I encourage you to send him a note (email or snail mail) and let him know how much you appreciated his efforts on behalf of our students and our Department.

Deborah Herrington



Professors **Rachel Powers** and **John Bender** traveled to Toronto this past July to present at the 68th meeting of the American Crystallographic Association. Dr. Powers co-chaired a session titled "Engaging undergrads in crystallographic research", in which Dr. Bender gave a talk: "Critical Mass: Organic-Organometallic Collaboration at the largest PUI". Dr. Powers also presented "Structure-based discovery and optimization of inhibitors for the class D β -lactamase OXA-24/40", a poster that featured the work of eight GVSU students including Chemistry majors C'arra Miller, Uyen Pham, Josephine Werner and Brian Basinski



"Exploring New Methodologies for the Treatment of Nuclear Waste using Ligands Containing Soft Donors" **Andrew R. LaDuca**, Thomas Neils, John E. Bender, Shannon M. Biros. National Organic Symposium, UC Davis, CA, June 25-29, 2017, poster.

"Synthesis of Derivatives of the Tripodal TREN-CMPO Ligand to Increase Ln and An Extraction Efficiency" **Brandon G. Wackerle**, **Michael Hudson**, John E. Bender, Shannon M. Biros. National Organic Symposium, UC Davis, CA, June 25-29, 2017, poster.

2017-2018 Arnold C. Ott Lectureship in Chemistry

The Arnold C. Ott Lectureship in Chemistry was created and endowed by a generous gift from Dr. Arnold C. Ott and Marion Ott. Dr. Ott received his Ph.D. in 1943 from Michigan State University in Chemistry/Physics/Bacteriology and is a leading chemist and entrepreneur in West Michigan. He is one of the co-founders of Grand Valley State University and served on the GVSU Board of Trustees for 28 years. The department of Chemistry hosts two Ott Lectures per year. During the 2017/8 academic year the department welcomed Drs. Brian Shoichet (University of California - San Francisco) and Daniel Neumark (University of California Berkeley).

Fall 2017

Dr. Brian Shoichet from the University of California - San Francisco gave two lectures on October 5th and 6th. His public talk, titled "How are new drugs discovered?" focused on ways researchers identify new compounds with biological activity. On Friday October 6th, Dr. Shoichet gave a chemistry-focused talk titled "Structure-based discovery for under- and over-studied GPCRs" that highlighted his groups' research endeavors.

Professor Brian Shoichet received his B.Sc. in Chemistry from MIT (1985). In doctoral work with Tack Kuntz (UCSF), he co-developed the first molecular docking screens, applying these to lead discovery against thymidylate synthase, a cancer target. As a Damon-Runyon Fellow with Brian Matthews (Institute of Molecular Biology), he used crystallography, mutagenesis, and biophysics to investigate a trade-off between enzyme activity and stability. In 1996, he joined the faculty of Northwestern University and was recruited back to UCSF in 2003, where he is a professor of Pharmaceutical Chemistry.

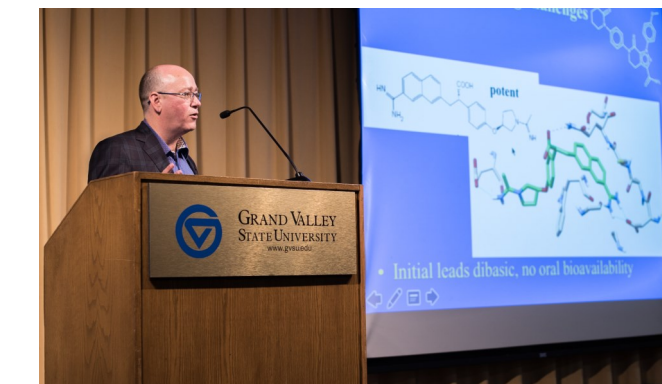
The Shoichet lab combines theoretical and experimental biophysical chemistry and chemoinformatics for drug discovery. More specifically, Dr. Shoichet's lab uses structure-based docking to screen large compound libraries for novel molecules that physically complement a binding site. When these searches are coupled to the right biological assays, they can find new molecules conferring new biology. This can happen for three reasons: targeting of an entirely new receptor, targeting of a new site on a known receptor, and occasionally targeting a known site on a well-established receptor with new biology. The lab has published over 180 papers which have been cited over 27,000 times. Shoichet is an inventor on 12 patents and has founded three companies. He lives in Marin County, California with his wife and son.

Winter 2018

On April 12th and 13th, the department hosted Prof. Daniel Neumark from the University of California Berkeley. The evening lecture title "Chemical reactions: what lies under the arrow?" focused on the importance of understanding transition states in chemistry. This lecture was followed on Friday with the chemistry seminar titled "Studies of radicals, catalytic intermediates, and transition states by slow electron velocity-map imaging of cryogenically cooled anions (cryo-SEVI)" highlighted the scientific methodology his research group utilizes to push the boundaries of the scientific field.

Professor Neumark and his research group carry out state-of-the-art experiments to probe fundamental problems in chemical physics. The projects in his laboratories encompass (i) reaction dynamics of bimolecular and unimolecular reactions, in which one maps out in detail the potential energy surfaces on which chemistry occurs, (ii) cluster spectroscopy and dynamics, which explore how the properties of matter evolve with size, and (iii) ultrafast x-ray science, where novel femtosecond and attosecond light source initiate and/or probe dynamics in the soft x-ray regime. Much of his work uses photoelectron spectroscopy of negative ions in either the frequency and time-domain to probe the spectroscopy and dynamics of transient and reactive species. His research has yielded new insights into transition state spectroscopy, the electronic and vibrational spectroscopy of clusters, the photodissociation of reactive free radicals, hydrated electron dynamics in clusters and liquid jets, and the ultrafast dynamics of helium nanodroplets excited by femtosecond soft x-ray pulses.

Professor Neumark was born 1955 and received his B.A., and M.A. from Harvard University in 1977 and a Ph.D. in Physical Chemistry from University of California, Berkeley, in 1984. He was a Postdoctoral Fellow at JILA, University of Colorado, 1984-86 before starting his independent career at UC Berkeley. Professor Neumark has served on the editorial advisory boards many journals including Journal of Chemical Physics and Accounts of Chemical Research. He was Director of the Chemical Sciences Division at Lawrence Berkeley National Laboratory from 2000-2010, and was Chair of the Department of Chemistry from 2010-2014. In addition to receiving numerous awards for his research, his group has published over 600 research articles.



Faculty & Staff Awards

Deborah Herrington: Michigan Distinguished Professor of the Year

Dr. Deborah Herrington is one of the state's three recipients of the Michigan Distinguished Professor of the Year award. This award recognizes the outstanding contributions and dedication exhibited by the faculty from Michigan's 15 public universities to the education of undergraduate students.

Among her many accomplishments are co-founding and serving as Director of the Target Inquiry Program which improves the professional development of high school and middle school science teachers, as well as helping teachers to create student-centered, inquiry-based classrooms. Dr. Herrington's other initiatives focus on building students' conceptual understanding in general chemistry as well as improving student advising, student success and connections with career services within chemistry and her college.

Dalila Kovacs: PEW Teaching Excellence Award

Dr. Dalila Kovacs employs active learning with students, facilitates students' research, and collaborates with colleagues to bring important concepts in green chemistry and toxicology to the Grand Valley chemistry curriculum. Upon forming relationships with students, she underscores the purpose of education in students' lives, captured in this student quote: "Bringing to the class attention that we are there for a reason and that college is a chance to learn and reach toward your dreams is something I think every weary college student needs to hear and be reminded of. Thank you again for your passion in organic [chemistry] and your obvious enthusiasm for life."

Andrew Korich: Teaching with Technology Award

Maximizing students' engagement in organic chemistry via technology is Dr. Andrew Korich's specialty. Using a scientific approach, he has demonstrated the value of using social media applications to reinforce course content. The publicly accessible Instagram account `daily_chem_problem` provides first- and second-semester students with study questions intended to reinforce organic chemistry concepts. He consistently reflects on this tool to review and improve it. Colleagues respect Korich's creativity, as well as his scholarly method of moving from problem to solution, assessment, and revision to better meet the needs of our students.

Todd Carlson: CLAS Lifetime Service Award

Dr. Todd Carlson received the 2018 CLAS Lifetime Service Award for his extensive contributions to a variety of programs at GVSU. Dr. Carlson was recognized specifically for nearly 15 years of work on college and divisional Curriculum Committees, as well as efforts to establish connections with academic institutions in other countries to better foster study abroad opportunities. Additionally, Todd has been active in the GVSU Science Olympiad Regional Tournament for over 30 years, and created several new SciO events including Storm The Castle and Map It.

Mary Jo Smith: The Innovation Award

The Innovation Award is established to recognize an individual AP staff member whose innovative ideas and practices benefit the university in a specific way. This could include methods to improve cost-efficiency, changes in procedures, creating new programs or services, or leading new initiatives. Mary Jo was nominated for her work on the safety videos for CHM 115/116. Mary Jo conceived the idea, wrote the scripts, recruited faculty narrators and student actors, helped direct the shots, and worked with IT to edit the videos. She also built safety quizzes around them, and continues to improve upon their use.

Sarah Clark: Unsung Hero Award

Professor Sarah Clark was recently chosen for the Unsung Hero Award recipient by the GVSU Women's Commission. In selecting her, the Commission recognized her efforts to build the Chemistry Success Center into a thriving enterprise that benefits students immensely, specifically by providing excellent tutoring services by a wide range of faculty and student experts. She was praised for her endlessly positive and encouraging attitude, and for serving as an excellent role model for aspiring female science majors, both amongst the student "clients" and the student tutors of the CSC.



ANNUAL STUDENT AWARDS

In April of 2018, the Chemistry Department honored many of its most outstanding students for the 2017-2018 academic year. The award winners in the different categories were as follows:

General Chemistry Award: The general chemistry awards recognize students who show excellence in general chemistry. Instructors that taught CHM 115 in the immediately previous Fall, Winter, and Summer semesters provide the names of three students who have excelled in the course. Instructors teaching CHM 116 in the current Winter semester, the previous Fall, or previous summer also submit three names. Awardees are selected from the compiled list based on names that appear twice. The award winners were **Chloe Binado Scott, Cassandra Cotter, Marris Cox, Sarah DeVries, Emily Hermann, Isabelle Hoebeke, Briana Larsen, Logan Leafers, Elizabeth Nisper, Emily Rodgers, and Samantha Super.**

Organic Chemistry Award: This award recognizes the top students from the CHM 241/242 sequence. Instructors teaching CHM 242 in the current semester, the previous fall, or the previous summer submit one name for each section based on the student's performance in CHM 241 and CHM 242. An award is given to every student who was chosen by a CHM 242 instructor. The award winners were **Madison Goen, Olivia Martin, Jarod Nickel, Clark Page, Gage Paul, Rhianna Sheesley, Jacob Smith, and Mia Wielenga.**

ACS Poly-Ed Award in Organic Chemistry: The recipient of this award was **Morgan Klein.** This award recognizes a student that excels in the majors organic chemistry sequence (CHM 245/246/247/248). The student must be a declared chemistry or biochemistry major and have completed the CHM 245-248 sequence by the end of the academic year. The student is selected by the instructors for these courses.

ACS Analytical Chemistry Division Undergraduate Award: **Katelyn Mackowski** was the recipient of this award, which is given to a declared chemistry or biochemistry major who is outstanding in CHM 221 and CHM 325. The student must have completed CHM 325 in the current academic year. The analytical chemistry faculty select the awardee from the best students meeting the above criteria based upon chemistry GPA.

ACS Inorganic Division Chemistry Undergraduate Award: **Trey Pankratz** was the recipient of this award, which is given to a chemistry or biochemistry major that has excelled in the inorganic chemistry courses CHM 273/471/477. The student must have completed CHM 477 during the current academic year. The Inorganic Chemistry faculty select the awardee based on the above criteria.

ACS Physical Chemistry Division Undergraduate Award: **Jess Mazzon** was the recipient of this award, which recognizes a declared chemistry or biochemistry major that has excelled in the upper level physical chemistry sequence (CHM 356/358). The student must have completed CHM 358 during the current academic year. The Physical Chemistry faculty select the awardee based on the above criteria.

ACS Outstanding Achievement in Organic Chemistry Award: This award is given to a graduating chemistry or biochemistry major who has excelled in a combination of organic chemistry courses (CHM 441/442/447) and research and has a desire to pursue a career in chemistry. The Organic faculty selects the awardee based of the above criteria. The recipient of this award was **Brandon Wackerle.**

Green Chemistry Award: This award is given to a declared chemistry major who has excelled in the green chemistry courses, CHM 421/427. Relevant performance in CHM 441 may also be considered. The student must have completed either CHM 421 or 427 in the current academic year. The faculty teaching these courses select the awardee based on the above criteria. This year's recipient was **Christopher Monday.**

Biochemistry Award: The recipient of this award was **Grace Peterson.** This award is given to a declared chemistry or biochemistry major who has excelled in the CHM 461/462/463 sequence. The student must have 1) completed or have in progress all three courses of the sequence and 2) completed either CHM 462 or 463 in the current academic year. Biochemistry faculty select the awardee based primarily on the above criteria, but other criteria (e.g. research and service contributions) may also be considered.

Senior Chemical Education Award: This award is given to a Chemical Education major, typically a graduating senior or other student who has successfully completed CHM 419/SCI 440 and who has demonstrated professionalism as a preservice teacher. Demonstration of professionalism may include activities such as tutoring on or off campus; attendance or presentations at professional conferences; participation in professional organizations, chemical education research, or outreach events; volunteering in schools, or other such activities. The Chemical Education faculty select the awardee from the best students meeting the above criteria, and this year the recipient was **Emily Uhl.**

American Institute of Chemists Award: This award is given to a declared chemistry or biochemistry major who has made significant contributions in service to the department. Nominations for the award can be submitted by any faculty/staff in the department (e.g. stockroom supervisor, the Chemistry Club advisor(s), etc.). The award winner(s) are selected by the Scholarship and Development Committee. This year, the winners were **Trey Pankratz** (Chemistry) and **Sara Barlow** (Biochemistry).



Outstanding Senior Award: To be eligible, a senior, presenting in CHM 491 this academic year, must be a declared chemistry or biochemistry major and have an overall GPA of 3.5 or greater.

The Chemistry faculty select an awardee based upon research participation, service to the department, extracurricular chemistry-related activities, and general attitude, enthusiasm, interest, and cooperation. The award recipients were **Betsy Trinklein** (Chemistry) and **Alanna Kenny** (Biochemistry).



Outstanding Undergraduate Research Award: In order to be eligible, a declared chemistry or biochemistry major must show outstanding skills, motivation, and progress in undergraduate research. This award is reserved for students that display exceptional abilities to a) thoroughly understand their research project, b) think critically and creatively in the research processes, c) work independently, and d) make significant progress in their research. In addition to participating in multiple CHM 499 and/or summer research opportunities, this student should also demonstrate the ability to disseminate their work to the scientific community either at regional/national conferences or through publications. The award winner(s) is selected by the Scholarship and Development Committee. This year's award recipient was **Brandon Wackerle.**

Outstanding Service Award: This award will be given to a declared chemistry or biochemistry major who has made significant contributions in service to the department. Nominations for the award can be submitted by any faculty/staff in the department (e.g. stockroom supervisor, the Chemistry Club advisor(s), etc.). The award winner(s) is selected by the Scholarship and Development Committee. This year's award recipient was **Brandy Curtis.**

Supporting our Students and the Chemistry Department

There are multiple ways that you can help continue your support of the GVSU Chemistry Department. The following is a list of funds that directly support GVSU chemistry students and the Department. To provide support for any of these programs go to www.gvsu.edu/give, choose *Other Fund* and search for the program name.

Retaining and Inspiring students in Science & Engineering (RISE) Program (Search: STEM Student Mentoring)

GVSU was recently awarded a five-year, one million dollar National Science Foundation (NSF) grant to support academically talented, economically disadvantaged students majoring in Science, Technology, Engineering, and Mathematics (STEM) through the RISE program. This program provides scholarships, mentoring, and paid experiential learning opportunities including:

- Renewable scholarship support
 - \$2,000 per year or more
- Faculty mentoring
- Curricular/co-curricular support for activities including research, internships, and cooperative education

We are looking for additional funds to support more students and keep this valuable program going beyond the five-year NSF grant

Chemistry Scholarships and Fellowships

- *Aaron M. DesRocher Memorial Chemistry Endowment Fund:** Assists enthusiastic upper level chemistry majors with finishing their educational journey with a minimum of educational debt.
- Mark A. Warren Memorial Scholarship:** Fund supports future junior and senior chemistry students complete their education.
- *Ott-Stiner Fellowship in Chemistry and Natural Sciences Endowment:** Financially assists students who are focused in Chemistry and the Natural Sciences while providing mentoring for students in the GVSU Summer Scholars program.
- *Professor Charles Knop Chemistry Scholarship Endowment:** Provides an award for an outstanding chemistry major.
- *William Schroeder Undergrad Endowed Fellowship in Chemistry:** Assist students who participate in GV Student Summer Scholars program and interested in research in the field of Chemistry.

Chemistry Support Funds

- Chemistry Instruments and Infrastructure Fund:** The assets of this non-endowed fund are used to purchase and maintain instrumentation, software, and other infrastructure for research and teaching in Chemistry.
- **Chemistry Support Fund:** This fund helps to ensure the Chemistry Department's ability to purchase and maintain excellent instrumentation for the long term. With support of faculty and alumni, seed money from Dr. Bill Schroeder, and a matching gift from Drs. Bob Smart and Sara Kane-Smart, this permanent resource has grown to over \$60,000.00!
- *Weldon Memorial Chemistry Endowment:** This fund supports supplies, equipment, travel, and similar needs for undergraduate research projects in Chemistry

Earn More for Chemistry

* Faculty & Staff, every gift you make to any of these endowed fund is matched by the university 1:1 for the same purpose.

**Help us earn every penny of these year's match for the *NEW* Chemistry Support Fund:

Alumni, your gift will be matched 1:2 by the Kane-Smarts and their university match

Faculty and Staff, your gift will be matched 1:3 by the Kane-Smarts **and** double university matches for your gift and theirs

Give by 12/31/18 directly to the Chemistry Support Fund at www.gvsu.edu/giving/chemistry

Chemistry Department Instrumentation Update 2018

Acquiring up to date equipment is vital for our department and with help from the Dean's office and support via donations we continue to obtain new instruments. The Chemistry Instruments and Infrastructure fund was established and is a non-endowed fund that provides funding for new instrumentation. Donations from our graduates are encouraged and of course much appreciated!

In addition, donated equipment is always welcome. An ICP/MS donated by Honeywell Burdick and Jackson in Muskegon was recently brought on line and will be maintained as long as parts are available (see below). Some repairs had to be made to the unit but it seems to be working well at this point. Other instruments are also being maintained but this becomes challenging as the instruments reach an age where the manufacturer no longer supports them. An update about newer acquisitions follows.

JEOL NMR

A new JEOL ECSZ 400 MHz NMR was purchased and is intended to be used for research and training at GVSU. This instrument was funded by a grant from the National Science Foundation's Major Research Instrumentation program. The grant was written in collaboration with Grand Rapids Community College and Aquinas College and the principle investigators were Shannon Biros, Felix Ngassa, John Bender, Tom Neils (GRCC) and Jonathan Fritz (Aquinas).

This instrument will be replacing the older Jeol 300 MHz unit which served us well for more than 20 years. Installation of the new Jeol was completed in June of 2018. The flooring in the room was also replaced.

ICP/MS

The ICP/MS donated by Honeywell Burdick and Jackson was in good condition when received. Some work was done to tune the instrument and replace some worn consumables and it is working fine. The chiller needed some repair but is now working well chilling the turbomolecular vacuum pump on the mass spectrometer.

PREPARATIVE HPLC

A refurbished preparative HPLC system was purchased to support research but may be used for some upper level lab classes. The Agilent 1100 series instrument is comprised of two preparatory pumps, an auto sampler, a diode array detector, and a prep scale fraction collector. The system is controlled using Agilent Chemstation software.

UV-VIS SPECTROMETER

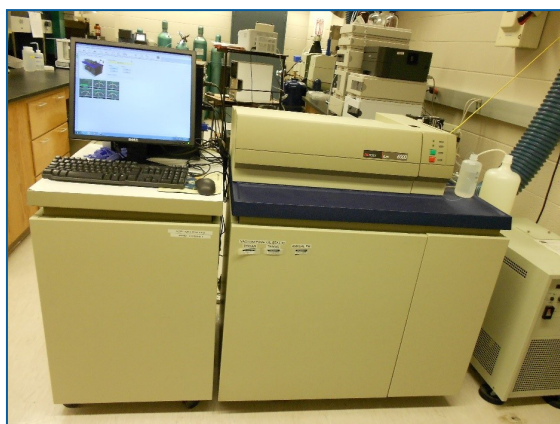
Funding from the Dean's office has been allocated for the purchase of a new UV-VIS spectrophotometer, a Thermo Genesys 150. Our current UV-Vis spectrometers are aging. The newer system is faster and has a longer linear range, attributes needed in some situations, especially in advanced labs and research. The unit is smaller and has an intense light source that allows addition of a fiber optic probe so spectra can be obtained from reaction flasks (no such ability currently). This instrument has superior scan speeds compared to any current systems allowing for the study of solution kinetics. The unit includes the fiber optic probe and a sipper allowing for fast student throughput in larger labs. The new unit can run in stand-alone mode (no computer necessary) and is more portable so that it can be used by many labs.

VACUUM PUMPS for ROTOVAPS

Two additional vacuum pumps were obtained with help from the Dean's office. These will be put into service so that the department can utilize more rotary evaporators (rotovaps). One pump will go into an advanced synthesis lab in which there is a new, unused rotovap that was not in use due to not having a pump. This working rotovap system will be used by students in CHM 447, 477, 246, 248, and 499 and also by several research groups. The other pump completes a rotary evaporator system that was rebuilt from salvaged parts. That completed unit will be used by several research groups in a shared research space.



Jeol 400 MHz NMR



Perkin Elmer



Agilent 1100 Series



Thermo Genesys 150



Senior Parting Shots

Students from the class of 2018 were asked to share their future plans after graduation and reflect on some of the memories they made during their time at GVSU. They were asked: (1) Where are you from?; (2) Where you are going after graduation?; (3) What are the fun memories you have during your time here at GVSU?; (4) What was your favorite or most memorable chemistry class at GVSU?; (5) If there is one famous chemist/scientist you admire (not your professors), who will that be?; (6) One fun fact that only your peers and classmates may know about?; (7) Where do you see yourself 10 years from now?; (8) Anything else you would like to share?

Grace Peterson

1. Spring Lake, MI
2. I will be attending Oakland University William Beaumont School of Medicine to work toward my MD.
3. My favorite memories about GVSU have been all the times I've worked to find my niche—and I did find it! As a student athlete and a pre-medicine (BMS and Biochemistry) student, I have some really great groups of friends who are going through the same things that I am. I have met so many amazing people, and I've made friendships which I hope will last for the rest of my life.
4. My favorite chemistry class was the biochemistry sequence... and probably most specifically CHM 463. Overall, the biochemistry courses were very interesting, and they really brought me to an understanding of my medical classes which I don't think I would have obtained otherwise. Plus, I had Dr. Leonard for all three courses, and he was one of my favorite professors here at GV!
5. I admire Rosalind Franklin, who was largely underappreciated and went relatively unrecognized for her work on X-ray crystallography of DNA molecules. She was a pioneer who allowed for enormous advancements in the fields of biochemistry and biology, even if she wasn't awarded the Nobel prize her colleagues believed she deserved!
6. I currently hold the GVSU track and field record in the pentathlon.
7. Ten years from now, I predict that I will be working as a physician—possibly completing my fellowship in order to specialize in some field of internal medicine.

Sydney Shavaliar

1. Grand Rapids, MI
2. Graduate school (not sure where yet)
3. My favorite part of my time at GVSU is doing research. I really enjoy diving deep into one topic and learning as much as I can about it.
4. Quantum Mechanics with Dr. Lawrence - it was really cool to learn about interesting topics in a small class setting.
5. Marie Curie. I admire the fact that she overcame a lot of hardship and opposition to study something she was passionate about.
6. I have been playing the flute since I was 11. I really enjoy it!
7. I will (hopefully) have a PhD and a job in academia.

8. I have really enjoyed my time at GVSU and am grateful for how much I have learned.

Madelyn (Dolly) West

1. Grand Rapids
2. Applying for (and hopefully attending) dental school
3. Research with Winchester, running columns, and anything related to cinnamaldehyde.
4. Organic chemistry. This was the first class I had taken that was simultaneously exciting, challenging, and applicable. Fifty minutes flew by in orgo.
5. Howard Florey
6. The most embarrassing thing I've ever done is pick a multiple choice option that had five bonds drawn to carbon.
7. If asked to envision yourself in the future why would you ever pick anything other than hammocking on a beach with margarita in hand?
8. The amazing chemistry faculty has been the best part of my experience at GVSU.

Safiya Best

1. Detroit
2. Graduate school preferably West Virginia University
3. Dancing with the Royal Dancers Majorette Team and modeling with Model Entertainment
4. Biochemistry because I had the best teacher at GVSU
5. n/a
6. I cheered at GV
7. I see myself as a senior forensic toxicologist

Christopher Peruzzi

1. Dearborn Heights, MI
2. Michigan State University for graduate school
3. Weekly meet ups to finish Dr. Lawrence's physical chemistry homework assignments during my junior year -- having a group of friends you're close with to work on difficult problems in chemistry made it so much more enjoyable, especially as we all suffered (happily)!
4. Organic chemistry or advanced organic chemistry lab -- it's a hard choice though. I learned and grew my love for chemistry most significantly starting in organic chemistry with Dr. Biro's and many nights were spent staying up late studying or going through reactions with other classmates. Wouldn't have wanted to spend my time any other way. Also because I'm a lab rat and love setting up intricate reactions, advanced organic lab was probably a very, very close second!
5. Phil Baran -- the man is a total synthesis wizard and he actively works on some of the most challenging natural product targets finding the most efficient pathways to build them.
6. Once I was running a reaction on the Schlenk line where I added nitromethane (read: funny car fuel) to the flask. This immediately led to the formation of red hot coals and brown NOx gas. I promptly left the room when I saw this and no fingers lost!
7. Hopefully in industry working on pharmaceuticals or catalysis.



Aaron Capps

1. I am from Berrien Springs, MI
2. I will be interning at Gentex in their Research and Development department this summer
3. Probably the most fun I had while at GVSU took place with all the amazing human beings who work in the CSC. Everyone there knows how to not only work hard, but to also know how to have a good laugh. I will never forget Sarah's Christmas party last year. The white elephant gift exchange led to some truly comical moments.
4. My favorite chemistry class was CHM 475, electrochemistry. It was a fun and challenging course that really taught me a lot about different applications of electrochemistry and the theory behind it. It really helped me to decide that it was a key area of interest for me.
5. I probably admire Michael Faraday the most. His tenacity to take not only pull himself up from poverty but to also become one of the most prominent scientists of his day is truly inspirational.
6. I play the violin and the viola. I also am one of 7 children in my family.
7. I see myself working on research to help better understand the complexities of the natural world in all its beauty.
8. GVSU's chemistry department is one of the best places to study on campus. I am truly grateful to have had the opportunity to study here. Thank you for everything!

Trey Pankratz

1. Grandville, MI
2. University of Wisconsin - Madison
3. I really enjoyed being around all my friends here at GVSU, I feel like my friend network has both been there when I wanted to party and when I needed to complain, both of which I feel like are integral to a good college experience.
4. Probably CHM 273, because it is the first chemistry class I took at GVSU after transferring from GRCC, and because it was an in-depth look at some topics that I find really interesting.

5. I always hate these kinds of questions, but if I had to pick maybe J. Robert Oppenheimer, because he knew how to immortalize a moment. Additionally, the approximation that gets his name was fairly important to the research I did this year.
6. When I was 10, my house was struck by lightning.
7. I mean it would be great if I returned as the Ott lecturer, but that's a fairly lofty goal. So I'll go with doing research on a project I enjoy, after getting that PhD of course.
8. Thanks to GVSU for the boring times, the [other] times, and the great times. I'll always look fondly on my memories here.

Brittany Sincox

1. Melvindale, MI
2. Working on my Ph.D. in Neuroscience from University College London and the National Institutes of Health
3. Being able to study abroad in Japan!
4. Chem 115! It was my first real introduction to chemistry and gave me one of my first valuable mentoring experiences. I would say Chem 462 but that was an 8am downtown and that definitely knocks it down a few spots on my list.
5. Rosalind Franklin. She was robbed of the Nobel prize!!! She also got ovarian cancer because the safety precautions for her x-ray machine were getting in the way of her science, and that's unfortunate but incredibly hardcore.
6. If you have a spare 5 minutes, ask me about sentient cabbage.
7. I will be the next Bill Nye! Bringing female scientists into the pop-culture realm will inspire more young girls to pursue STEM careers.
8. A quick shout out to Dr. Lord for writing me a letter of rec for McNair with a two-day notice. I wouldn't be doing half of the things I'm doing now if it wasn't for that program!!

Congratulations to all of our graduating seniors!



Alumni Spotlight

Our alumni impact the world both locally, here in West Michigan and other communities around the country. They have become educators, doctors and scientists. We started begun our "Alumni Spotlight" series last year to share their stories. This year we caught up with a recent graduate **Dr. Zac Garlets** to see what he has been doing since graduating in 2012.

Why did you choose GVSU and what year did you graduate? I am a Grand Rapids, MI native, and I elected to go to Grand Valley because it was close to home for my wife and I. I graduated in 2012.

What do you most remember from your time at GVSU? I remember studying in the inner corridor of the top floor of Padnos. When I was at GVSU, there was a main core of students who spent almost all of their time on campus both in the inner corridor and in the computer lab.

What are you doing today and how did your education at GVSU help prepare you for what you are doing today? I am currently conducting postdoctoral studies on dirhodium-catalyzed carbene C–H insertion reactions with Professor Huw Davies at Emory University. My studies at GVSU prepared me well for my doctoral work at the University of Michigan under the guidance of Professor John Wolfe where I studied metal-catalyzed alkene difunctionalization reactions. In the future, I hope to apply my training in catalysis towards the development of new reactions in the pharmaceutical industry.

What is one lesson your learned from your time at GVSU that you have been able to apply to your career? I learned time management at GVSU, and I learned what I can really do with my time if I use it *all* wisely. This was most acute at GVSU when my first child was born the Sunday of finals week when I was enrolled in analytical chemistry, organic chemistry, physical chemistry, and physics. Things haven't changed for me in this regard. When I defended my PhD thesis March 2017, my wife and I had another

child three weeks earlier and I wrote an NIH postdoctoral graduate fellowship which was due the week after I defended. Life just doesn't seem to slow down.

What did you wish you had known while you were an undergraduate? I wish I would have known what I really wanted to do. I knew I wanted to go to graduate school, and I knew I wanted to study organometallic chemistry, but I didn't know that I was supposed to develop some sort of career. This notion only came midway into my graduate studies which in many regards was too late. I wish I would have envisioned where I would be with my career 20 years from now because then I could have planned better.

What advice do you have for GVSU alumni and students interested in pursuing your profession? Get started early and be sure you know are doing what you want to be doing. I witnessed many colleagues in graduate school who realized they made the wrong choice. They were then faced with either leaving graduate school or continuing to pursue their PhD and being unhappy with their career path.

Any final comments you wish to include: Synthetic chemistry is an amazing field to pursue. It's the only field that I have found the perfect balance of working with my hands and with my brain. The ability to build new molecules that have no precedent in history never grows old, and it provides an opportunity to change the world at the most fundamental level.



Student Scholars Day 2018

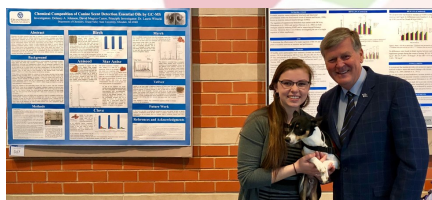
The 22nd annual 2018 SSD was held on April 11th, 2018 and our chemistry and biochemistry students and faculty were very well represented. There were 28 posters or presentations representing 34 students and 14 chemistry/biochemistry faculty research groups. President Haas also stopped by many of the chemistry posters.

An Inorganic Study of Phosphine Based Compounds

Presenters: Sydney Shavallier, Anthony Spyker
Mentor: John Bender

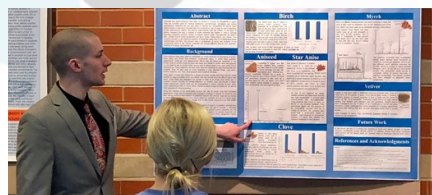
An Investigation in the Awareness of Desirable Difficulties in Undergraduate Chemistry Courses

Presenter: Emily Uhl
Mentor: Thomas Pentecost



Chemical Composition of Canine Scent Detection Essential Oils by GC-MS

Presenters: Delaney Johnson, David Mugica-Canos
Mentor: Laurie Witucki



Chiral Separation of Silanes via Capillary Micellar Electrokinetic Chromatography

Presenter: Sydney Shavallier
Mentor: Andrew Lantz

Computational Exploration of Ni-Catalyzed C-N Bond Formation

Presenter: Mark Janiga
Mentor: Richard Lord

Creating a Representation of Lysozyme Mechanism Using Virtual Reality Technology

Presenter: Brittany Sincox
Mentor: Mary Karpen

Hybrid Shrub-Willow Biomass

Presenter: Andrew Freiburger
Mentor: Dalila Kovacs

Electronic Structure of Transition Metal Carbenes and Nitrenes in Bis(alkoxide) Ligand Environments

Presenters: Nicholas Dewey, Eleanor Di Girolamo
Mentor: Richard Lord

Expanding the Role of C-N Coupling Reactions: Targeted Synthesis of Novel Antibiotic

Presenter: Morgan Carpenter
Mentor: Matthew Hart

Expression and Ligand Binding Analysis of BshC, an Elusive Enzyme Involved in Bacillithiol Production

Presenter: Alanna Kenny
Mentor: Paul Cook

Initial Analysis of Novel Soft Electron Donor Ligands for Potential Use in Nuclear Waste Remediation

Presenter: Andrew LaDuca
Mentors: John Bender, Shannon Biros

Investigation of Novel Silicon Anions as Reagents for Synthesis

Presenter: Madelyn West
Mentor: Randy Winchester

Investigation of Phosphine Ligands and Their Ability to Coordinate to Metals

Presenter: Jackson Mort
Mentor: John Bender

Preparation of Synthetic Analogs of Modafinil

Presenter: Alexandra Williams
Mentor: Randy Winchester

Progress Towards Synthesis and Isolation of Phenoxy Vinyl Ether Bound Iron Centers For Use in Future Kinetic Studies

Presenters: Andrew LaDuca, Christopher Peruzzi
Mentor: Stephen Matchett

Reactions of Dppm

Presenters: Phillip Dietz, Pauline Mansour
Mentor: John Bender

Simulation of the UV-Vis Spectra of Nickel Pincer Halide Complexes

Presenter: Trey Pankratz
Mentor: Richard Lord

Structural Analysis of a Novel Inhibitor Bound to *Acinetobacter*-derived Cephalosporinase (ADC-7)

Presenter: Erin Fish
Mentor: Bradley Wallar

Structural and Functional Characterization of Fragment-based Inhibitors for OXA-24, an Antibiotic Resistance Enzyme

Presenter: Uyen Pham
Mentor: Rachel Powers



Structure-based Inhibitor Discovery for a Key Clinical Antibiotic Resistance Target

Presenter: Brian Basinski
Mentor: Rachel Powers

Study of Organometallic and Phosphine Ligand Synthesis and Determining Chelation Properties

Presenter: Kyle Korman
Mentor: John Bender

Synthesis and Characterization of Novel Diphenyl Urea Compounds

Presenter: Phillip Dietz
Mentor: Matthew Hart

Synthesis and Characterization of Phosphine Chalcogenide Ligands

Presenters: Joshua Ojeda-Retamal, Ali Salame
Mentor: John Bender

Synthesis of Phosphine Ligand Derivatives for Chelation of Metals

Presenters: Kyle Korman, Jackson Mort
Mentor: John Bender

Synthesis of Vinyl Silyl Anion

Presenter: Jenna Seymour
Mentor: Randy Winchester

X-Ray Crystallography and Functional Studies for the Analysis of BshB and its Paralog Bca

Presenter: Daniel Caylor
Mentor: Paul Cook

Modification of the Traditional TREN Scaffolding in Molecular Ligands for Use in Lanthanide and Actinide Metal Remediation

Presenter: Michael Hudson
Mentor: Shannon Biros

Solid Phase Peptide Synthesis of Potential Focal Adhesion Kinase Inhibitors

Presenter: Michael Maleszyk
Mentor: Laurie Witucki

2017-2018 Faculty Colloquia

Brad Wallar – Fall 2017

Characterizing novel inhibitors in the fight against β -lactamase-mediated antibiotic resistance

β -lactam resistance in *Acinetobacter baumannii* presents one of the greatest challenges to contemporary antimicrobial chemotherapy. Much of this resistance derives from the class C β -lactamase enzymes, known as *Acinetobacter*-Derived Cephalosporinases (ADCs). The Wallar lab specifically studies a class of novel boronic acid compounds in order to identify the most effective inhibitor of the ADC-7 β -lactamases. If the activity of the ADC enzymes can be blocked by binding to inhibitor molecules, then the antibacterial ability of numerous antibiotics could be restored. Through research collaborations with Fabio Prati's lab (University of Modena, Italy), Robert Bonomo's lab (Case Western Reserve University), and Rachel Powers' lab (GVSU), we have characterized a group of inhibitor compounds that can bind and inhibit ADC-7. In addition, using X-ray crystallography, we have determined the specific enzyme-inhibitor binding interactions that may allow for the further optimization of potential antibacterial drugs. The Winter 2017 sabbatical period allowed for the complete characterization of two groups of inhibitors, leading to two publications in the American Chemical Society journal *Infectious Diseases* (including four GVSU undergraduate co-authors) and documentation of the process that converts X-ray diffraction data into the complete X-ray crystal structure. In addition, these results provided the pathway for new groups of inhibitors to characterize in our overall quest for ADC β -lactamase inhibition.

Jessica VandenPlas – Winter 2018

Representational Competence in Chemistry

Dr. Jessica VandenPlas discussed her sabbatical activities at the University of Illinois, Chicago in her talk "Representational Competence in Chemistry." Representational competence is a suite of skills necessary for success in chemistry, including the ability to identify and analyze the features of a representation, generate or choose appropriate representations to complete a task, and transform among multiple representations. Particularly in organic chemistry, which relies upon multiple forms of representations to convey information about molecular structure and shape, students struggle to develop these skills. Her talk focused on results from studies conducted at both UIC and GVSU, which measured student response time and visual attention markers (measured via eye tracking) during tasks that required translating among multiple representations of organic structures. Results suggest that students struggle to mentally manipulate and compare structures when representations are varied, and that it can take up to 20 seconds for students to complete simple translation tasks between representations.

Deborah Herrington – Winter 2018

3 Dimensional Learning and Assessment: Teaching and Assessing what we Value

As chemistry instructors we want our students to be able to not just learn chemistry facts or concepts, but to be able to apply those concepts as scientists would to construct explanations, craft arguments, and ask meaningful questions. This goal aligns with recent science education reforms in the US that emphasize the importance of three dimensional (3D) learning; learning that integrates core ideas of the discipline, science practices, and cross-cutting concepts. Yet, particularly at the introductory level, assessments frequently focus on isolated skills and knowledge fragments. Rarely do we assess students' abilities to use science practices appropriately, which is problematic given that students focus their attention on what we assess. During her sabbatical, Dr. Herrington focused on developing assessment items, incorporating 3D learning into introductory chemistry courses, and evaluating the impact of 3D learning and assessments on student outcomes. She described strategies she used to modify her assessment items to integrate content, process, and cross cutting concepts, data to support the importance of developing appropriate questions and scaffolds for uncovering students' understanding of core chemistry concepts, and how she is integrating what she learned during her sabbatical into her general chemistry courses at GVSU.

255TH AMERICAN CHEMICAL SOCIETY
NATIONAL MEETING & EXPOSITION

nexus of
**FOOD
ENERGY
& WATER.**

MARCH 18-22, 2018
NEW ORLEANS, LOUISIANA

GVSU Chemistry was well-represented at the 255th ACS National Meeting & Expo in New Orleans, LA last March. Professors **Debbie Herrington**, **Tom Pentecost**, **Shannon Biros** and **Jessica VandenPlas** gave talks covering their work:

- Synthesis of multimodal organic ligand frameworks for use in combining CMPO groups (Biros)
- Developing assessment tasks for the scientific practices: Alignment, design, and testing (Herrington)
- Investigation of general chemistry assessment item stability: Same items, different form – what changes? (Pentecost)
- Modeling split attention during simulation use (VandenPlas and Herrington)

Additionally, ten posters were presented from the groups of GVSU faculty **Felix Ngassa**, **Matt Hart**, **Debbie Herrington**, **Scott Thorgaard**, **Randy Winchester** and **Shannon Biros**. Chemistry majors **Zach VanderTuin** (Thorgaard), **Aaron Capps** (Thorgaard), **Alexandra Williams** (Winchester), **Phil Dietz** (Hart), **Hunter Pearson** (Biros), **Brandon Wackerle** (Biros) and **Michael Hudson** (Biros) all attended and presented their work.

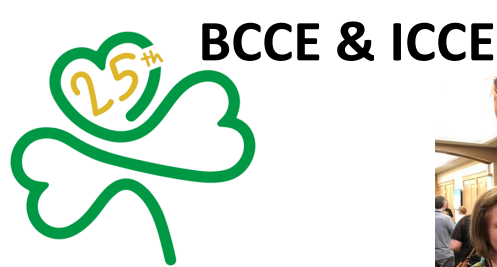
Professor **Jessica VandenPlas** chaired a symposium titled “Eye Tracking Research in Chemistry Education”.



Left to Right: Hunter Pearson, Michael Hudson and Brandon Wackerle

Right: Alexandra Williams

Left: Aaron Capps



ICCE 10
SYDNEY | JULY 10-14, 2018



Julie Henderleiter dancing with a T-Rex

This past summer, GVSU Chemistry had a major presence at two conferences that focus on Chemical Education.

The 25th Biennial Conference on Chemical Education was held in late July at the University of Notre Dame. **Tom Pentecost** presented two papers including one entitled “Factors that impact the difficulty of general chemistry exam items”. **Sarah Clark** presented “Revising an introductory Peer-Assisted Study Session program to increase student participation” in a symposium covering support initiatives for freshman chemistry students. **Dalila Kovacs** presented in the symposium “To Green or Not to Green? Approaches for Including Green Chemistry in a Traditional Academic Setting: Teaching, Research & Service” and also organized a workshop titled “Teaching Toxicology in Chemistry Courses: Resources and Techniques”. The talk “Getting started with eye tracking for chemistry education research” was presented by **Jessica VandenPlas**, while **Brittland DeKorver** organized a workshop titled “Creating outreach shows that use demonstrations to teach concepts”. Included among several talks by **Debbie Herrington** was her presentation “Effective scaffolding for students’ out-of-class use of chemistry simulations”. Also attending were Professors **Randy Winchester**, **Rachel Driscoll** and **Laura Hawk**.



Brittland DeKorver and collaborator
Holly Walter Kerby (Wisconsin)

Two GVSU professors also travelled down under for the 25th International Conference of Chemistry Education held in Sydney, Australia in June. **Jessica VandenPlas** was invited to give a talk titled “Test-taking behavior: Student representation use during assessment”, while **Debbie Herrington** presented “Meeting our students where they are: Using text messaging to promote effective studying and provide formative assessment in introductory chemistry”.

Faculty News and Research Highlights

The Chemistry Department has consistently maintained as its priority research endeavor that involves the active participation of undergraduate researchers. Herein is provided our update of some faculty research activity.

Analytical

In the past year **Dr. Andrew Lantz's** lab has worked on several research projects: 1) the development of an organic redox electrolytes for energy storage in collaboration with Vinazene, Inc., 2) the development of a capillary electrophoresis based methods for the enantioseparation of chiral silanes and isoelectric focusing of GAP-43 protein, and 3) the development of in-field methods for analysis of primate olfactory compounds using portable gas chromatography-mass spectrometry instrumentation in collaboration with Cynthia Thompson in the Biology department. Dr. Lantz was on sabbatical for the Winter 2018 semester and focused on long-term charge/discharge testing of organic electrolytes for the flow cell battery project.

Dr. George McBane continues his work on gas-phase collisions and reactions using both computational modeling and experimental methods. During winter 2018 he supervised a group of three new first-year students in the laboratory. He and **Dr. S. Schaertel** are continuing to work with one of them, Tyrese Lillard, as an MS3/Ott-Stiner Scholar during summer 2018. In computational projects Dr. McBane is currently working with collaborators at Radboud University Nijmegen in the Netherlands, the National Research Council of Italy, and Texas A&M University.

Dr. Stephanie Schaertel, Dr. George McBane, and former student Christian Cannella published a paper [J. Chem. Educ. 95, 173 (2018)] that describes a safe and low-cost laser spectrometer for fluorescence measurements in the millisecond regime. Dr. Schaertel initiated this project as part of her sabbatical work.

Organic

Dr. Shannon Biros and her research group, in collaboration with **Dr. Bender**, continue to synthesize novel compounds for use as lanthanide and actinide extraction agents. Three students graduated from the Biros group in April 2018: Brandon Wackerle (graduate school at Clemson), Michael Hudson (medical school at Central Michigan) and Hunter Pearson (bioanalytical scientist at Pharmoptima).

Dr. Laura Hawk's research group has started up and is exploring biomolecular interactions using peptide-based systems. Dr. Hawk and her research team are making extensive use of a newly acquired preparative HPLC system.

Dr. Andrew Korich is currently on sabbatical at the University of Virginia. His work deviates from the small molecule synthetic work he's conducted at GVSU and focuses on polymer synthesis and kinetics. Pauline Mansour, a member of the Korich group since her freshman year, graduated from GVSU in May 2018 and will be a first year graduate student in chemistry at Michigan State this fall.

Dr. Felix Ngassa continues research in synthetic organic and computational chemistry. Four undergraduates worked in the Ngassa

lab in the 2017-2018 school year. A synthetic project on arylsulfonamides resulted in a publication with three undergraduate co-authors, "Crystal Structure of N-Allyl-4-methylbenzenesulfonamide" published in Acta Crystallographica Section E Crystallographic Communications, 2018. A computational project involving two undergraduate co-authors on "Theoretical Circular Dichroism Spectra of the Alpha-Helical Protein Calxectin with the Dipole Interaction Model Including the n-p* Transition" was also published in the Journal of Undergraduate Chemistry Research, 2018.

Dr. Randy Winchester continues to investigate novel silicon compounds. Allie Williams joined the group and started a new research area that has been very productive looking at silicon based Modafinil analogs. We have found that the benzhydryl group creates interesting sterically hindered molecules. Allie presented at the Winter ACS meeting in New Orleans. Dolly West, who is graduating in winter 2018 will present her research on synthesizing vinyl silanes in Boston this fall. Congrats to group member Nicole Gibbons (class of 2011) who has completed her Ph.D. at the University of Florida and is now working at Intel in Seattle. Dr. Winchester will be taking a full year sabbatical to pursue research full time in 2018-19.

Dr. Laurie Witucki's research continues in the area of solid phase peptide synthesis for investigations into tyrosine kinase specificity and synthesis of kinase inhibitors. Congratulations to graduating biochemistry major Mike Maleszyk who finished his work on this project and is off to Pharmacy school at UM. Also in 2018 several new projects were developed. The first investigates the chemical composition of steam distilled and chemically extracted essential oils by GC-MS. Two current GVSU students, Delaney Johnson and David Mugica-Canos were active in this project including steam distilling materials from plant sources such as myrrh, vetiver, birch and anise. Many of the essential oils studied are utilized in canine scent detection competitions (dogs get to sniff them). A second project was established as a collaboration with Dr. William Schroeder and involved a section of the CHM 248 Organic majors lab. As a research project capstone in the majors lab, these students worked to synthesize 33 novel compounds to be tested for antibiotic activity by Dr. Rod Morgan in the Biology Department at GVSU.

Chemical Education

Dr. Brittlend DeKorver was awarded GVSU's Catalyst Grant to investigate students' perceptions of risk and danger in the laboratory. She worked with GVSU student AJ Reau to measure students' fears in the general chemistry laboratory classes. In addition, her collaboration with Alchemie Solutions Inc. received a Small Company Internship Award to hire GVSU students Han Le and Christopher Nostrant to investigate how Alchemie's Mechanisms app impacted GVSU students taking organic chemistry. In the summer of 2018, Dr. DeKorver presented work investigating the role of undergraduate research in chemistry education with Dr. Ellen Yezierski (Miami University) at the Biennial Conference on Chemical Education in South Bend, IN.

This past year **Dr. Deborah Herrington** has been working on several projects. She wrapped up her work with the Target Inquiry (TI) project. During summers 2017 and 2018 she worked with several high school chemistry teachers to incorporate many of the TI activities into

a research-based high school chemistry curriculum that is aligned with the Next Generation Science Standards. She began work on developing assessments to determine the extent to which laboratory curricula impact students' abilities to use science practices in collaboration with Dr. Melanie Cooper (MSU) and Dr. Justin Carmel (Florida International University), and GVSU undergraduate students Michelle Dykstra and Emily Kremkow (funded by NSF). Finally, she is continuing her work on the NSF funded Facilitating Online-learning in Chemistry Using Simulations project in collaboration with **Dr. Jessica VandenPlas** (GVSU) and Dr. Ryan Sweeder (MSU), working with GVSU undergraduate students Lauren Miling and Stella Archiyan on data collection and analysis. Work from this project resulted in a poster and talk at the spring American Chemical Society meeting and presentations at the 2018 Biennial Conference on Chemical Education in South Bend, IN and at the 2018 International Conference on Chemistry Education in Sydney, Australia. As an additional part of this project, Dr. VandenPlas has been working with a group of Computer Science majors to develop a new simulation focused on buffers which we plan to work on implementing into classroom instruction in the coming year.

Dr. Thomas Pentecost's current area of research is in the Application of Fundamental Measurement Principles in Chemical Education Research. He just completed a year-long sabbatical as the Theodore Ashford Fellow with the ACS Exams Institute and a visiting professor at the University of Wisconsin-Milwaukee. The sabbatical work focused on using Item Response Theory to investigate context effects on item difficulty and discrimination. Results were presented at the 2018 National Meeting of the American Chemical Society and the 2018 Biennial Conference on Chemical Education.

Dr. Julie Henderleiter is continuing her work with Otsego Public Schools. Her work has expanded from designing science instruction to include doing science experiments over the summer with the district literacy bus.

Inorganic Chemistry

Since coming to GVSU ~ 20 years ago, **Dr. John Bender** has deepened and diversified his interest in synthetic, main-group organometallic chemistry in a variety of ways, exploring widely across element groups. Current work is on the synthesis, Group 16-derivatization, and metal-coordination of Group 15 organometallics (P, Sb, Bi). He fully integrates these publication-oriented projects pedagogically between undergraduate research mentees, students in advanced synthesis courses, and their summer research program. The work is supported by superior lab and instrumentation facilities at GVSU (complete air-free synthesis, high-field multinuclear NMR), and mutually beneficial collaborations with his colleagues, and critical instrumentation support at Michigan State University (high-res MS and small molecule crystallography).

His lab collaborates extensively with the lab of his GVSU colleague Shannon Biros.

Dr. Richard Lord and his group continue their work modeling transition-metal catalysts. Undergraduate Nick Dewey was awarded a MSGC Undergraduate Fellowship and OURS S3 to study the mechanism of ketenimine formation catalyzed by transition metal carbenes in bis-alkoxide environments. Undergrad Trey

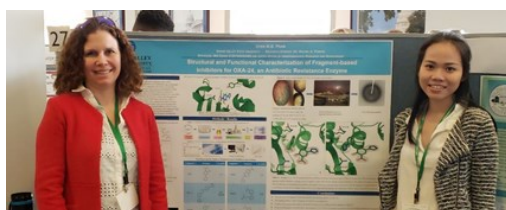
Pankratz presented work on simulating the UV-Vis spectra of nickel pincer complexes at the 30th MU3C conference in January, and that work in collaboration with Prof. Wei-Tsung Lee at Loyola University was recently submitted for publication. Richard is on sabbatical at the Center for Advanced Scientific Computing and Modeling at North Texas this Fall.

Biochemistry

Dr. Paul Cook and his group continue their work on structural and functional studies of the enzymes that produce and utilize bacillithiol, a molecule critical to bacterial resistance to the antibiotic fosfomycin. The group elucidated novel X-ray crystallographic structures of two important enzymes involved in these processes: BshA and BstA. This year, they published a paper in the journal Protein Science describing the structure and function of the BstA enzyme with GVSU alumnus Chris Royer as a coauthor. The ultimate goal of this work is to find new avenues to combat antibiotic resistance in gram-positive organisms.

Dr. Brad Wallar and **Rachel Powers** published two papers in the early part of 2018, both in ACS Infectious Diseases. The first article is titled: "Structure-Based Analysis of Boronic Acids as Inhibitors of Acinetobacter-Derived Cephalosporinase-7, a Unique Class C β -lactamase" second is "Inhibition of Acinetobacter-Derived Cephalosporinase: Exploring the Carboxylate Recognition Site Using Novel β -lactamase Inhibitors."

Dr. Rachel Powers and her research group are involved with several projects that focus on the structure, function, and inhibition of β -lactamases, key antibiotic resistance targets. Using a structure-based approach, they are characterizing novel inhibitors for class C and class D β -lactamases. These projects are in collaborations with GVSU colleagues Drs. Brad Wallar and Dave Leonard, Dr. Robert Bonomo (Cleveland VA Hospital), and Drs. Fabio Prati and Emilia Caselli (University of Modena, Italy). This past year, Dr. Powers' research group was made up of students Brian Basinski (BIC), Uyen Pham (BIC), Diane Mutete (BIC), Rachel Sprinsdorf (BMS), and Rebecca Parr (BMS). Brian received the Ott-Stiner Fellowship, an S3 grant that allowed him to conduct research full time last summer. Uyen Pham was funded by an MS3 grant to work full-time for part of the summer.



Recently, Uyen and Dr. Powers traveled to Washington D.C. where Uyen presented her work on Capitol Hill at the annual Posters on the Hill event sponsored by the Council on Undergraduate Research. Uyen's abstract was one of only 60 selected from over 400 submissions.

Dr. Powers attended the national meeting of the American Crystallographic Association in Toronto this past summer (July 20-24, 2018) where she co-chaired a session with Dr. Joe Tanski (Vassar College) entitled "Engaging undergrads with crystallographic research".





GRAND VALLEY
STATE UNIVERSITY

Chemistry Department
312 Padnos Hall
1 Campus Drive
Allendale, MI 49401

NONPROFIT
U.S. POSTAGE
PAID
GRAND VALLEY
STATE UNIVERSITY

22nd Annual Green Chemistry & Engineering Conference

Product innovation **using**
greener chemistries

PORTLAND, OR | JUNE 18 - 20, 2018



GVSU Professors and Student Attend National Green Chemistry Conference

Professors Dalila Kovacs, Jim Krikke and Chemistry major Andrew Freiburger attended the 22nd ACS Green Chemistry & Engineering Conference in Portland, OR this past summer. The three day event brings together academic and industry scientists from all over the world with the goal of advancing sustainable science practices. Andrew presented the trio's work in a poster titled "Hybrid Shrub-willow Biomass as Potential Raw Material for Platform Molecules".