EDITOR’S NOTE:

Herein we update you on the endeavors and success of the Chemistry Department. As we learn the ins and outs of the Pathways curriculum, we continue phasing in the trailer sections. The latter is proving to meet a greater demand than anticipated. It will be interesting after some time to see how this plays out.

Enjoy reading the wonderful achievements and activities of the department and students. We welcome any feedback or suggestions on anything that is in the report or anything you might like to see in the annual report.

Marilyn Wooten
2016
ANNUAL REPORT

TRINITY UNIVERSITY
DEPARTMENT OF CHEMISTRY

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REPORT FROM THE CHAIR

Greetings Alumni and Friends of the Chemistry Department!

We trust that 2016 was a good year for you and your family.

This past year was a year of change for the University and our department. As you may know, after hiring a new University President in 2015 (Danny Anderson), we hired a new Vice President for Academic Affairs in 2016 (Deneese Jones). Both new administrators appear to have a heart for Trinity students and the Trinity community. We are looking forward to working with them to make this great institution even better!

For the chemistry department, Professor Michelle Bushey retired after 26 years of dedicated service, only to start her second career as a program officer at the National Science Foundation in Washington. Professor Steven Bachrach, our Semmes Distinguished Professor for the past 17 years, decided to join the Dark Side and accepted a Dean of Science position at Monmouth University in New Jersey. Michelle and Steve will be greatly missed and we wish them all the best. We are grateful for their many years of service.

Thus, the chemistry department is experiencing some staffing changes. We will be hiring a new analytical chemistry professor and a new distinguished professor. All this is good and is part of the natural process of growth and change for an institution and an academic department. We are excited to see what the future holds!

As always, we enjoy hearing from our alumni and friends. When you have time, send us an email update. And, when you are in San Antonio, please let us know – we would love to visit, catch up, and show you the new Center for the Sciences and Innovation (CSI). It really is a beautiful building and a great place to work, teach and do research!

We continue our efforts to develop better forms of communication and networking of chemistry alumni, along with establishing some form of mentoring of present students by former students. Please make sure you join the TU Chemistry Linkedin group, the departmental Facebook group, and the alumni email distribution list. Perhaps you are receiving this annual report via one of these electronic forms of communication.

Always wishing you the very best,

Chris Pursell
Professor and Chair of Chemistry
cpursell@trinity.edu
(210)999-7381
2016 Chemistry, Biochemistry, and Biochemistry & Molecular Biology Graduates

BACHELORS OF SCIENCE IN CHEMISTRY

Megan Coffer: Attending graduate school at UT Dallas

David Leach: Attending graduate school at Rice University

Natalie Seitzman: Attending graduate school at Colorado School of Mines

BACHELORS OF SCIENCE IN BIOCHEMISTRY

Alexander Huther: Applying to medical school

BACHELORS OF SCIENCE IN BIOCHEMISTRY AND MOLECULAR BIOLOGY

Ashwin Adivi: Attending Medical School Tulane University School of Medicine

Emily Bowman: Applying Medical School Ph.D. programs

Natalie Dewitte: Attending Research Associate 1, UTMB

Michael Dybdal-Hargreaves: Attending Medical School UTHSCSA

Brigette Lee: Attending Medical School Baylor College of Medicine

Liezell Lopez: Attending Medical School Baylor College of Medicine

Jamal Murray: Attending Medical School UTHSCSA

BACHELORS OF ART IN CHEMISTRY

Alexis Daggett: Attending Veterinary School University of Wisconsin School of Medicine and Public Health

Samuel Lee: Currently working and applying to graduate school
2016 CHEMISTRY DEPARTMENT AWARDS

CRC Freshman Achievement Award
Camille Potts  Danyal Tahseen  Zoheb Hirani

Achievement in Organic Chemistry
Taylor Devlin

John A. Burke Award in Inorganic Chemistry
Todd Whittaker

Undergraduate Award in Analytical Chemistry
William Mobley

Outstanding Student Assistant Award
Julia Dapaah

SENIOR AWARDS

McGavock Award for Outstanding Research
David Leach

Award for Academic Excellence and Research in Chemistry
Liezelle Lopez

American Institute of Chemists Award
Natalie Seitzman

ACS Division of Inorganic Chemistry Undergraduate Award
David Leach

ACS Division of Organic Chemistry Undergraduate Award
David Leach

Senior Achievement Award in Research
Emily Bowman

McGavock Poster Award
Emily Bowman  Liezelle Lopez

Senior Service Award
Alexis Daggett  Natalie Seitzman
2016 McGavock Award Winner
David Leach

Ina Beth McGavock Scholarship Recipient
Truongan Nguyen 16-18

William Crews McGavock Scholarship Recipient
Nicolas Dwarica 15-17

EXTERNAL AWARDS AND RECOGNITIONS

Zoheb Harani won the award for Best Supramolecular Chemistry presentation, Rachel Shepherd and Camille Potts won the Outstanding Presentation Award in Biosciences in their groups at the Gulf Coast Undergraduate Research Symposium at Rice University.

The Chemistry Club, led during the year by Natalie Seitzman and Poojah Bollampoly, under the guidance of Christina Cooley and Adam Urbach received the Outstanding Chapter award by the American Chemical Society.

Christian Schreib was one of the Beckman Scholars and received a Goldwater Honorable Mention.
BOARD OF ADVISORS
MEMBERSHIP 2015-2016

The individuals listed below meet usually twice each year on the Trinity campus to advise the department on a variety of matters. The Board has been instrumental in assisting the department in fund-raising efforts, particularly for equipment. The Board members serve each spring as judges for the senior poster competition that are part of the McGavock program.

We all owe these folks a great deal of thanks for their unselfish work on our behalf.

Dr. Andrew Burke
Burke 9210@msn.com

Dr. Andrew Rusinko III, PhD
Alcon Research Ltd.,
R0-19, Fort Worth, TX
Andrew.Rusinko@AlconLab.com

Mr. Bruce A.
Story
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Joshua Woody, MD  
San Antonio, TX  
joshuataylorwoody@gmail.com
GIFTS AND DONATIONS
ALUMNET

The Chemistry Department gratefully acknowledges the support of alumni and friends during this past year. Your gifts and donations allow us to further support Trinity students and their chemical education. You are making a difference in the lives of the next generation of Trinity students. Thank you!

Please consider “giving back” and making a gift today or becoming a “regular giver”. Please use the link below. We appreciate your continued commitment to Trinity University and the Chemistry Department.

http://new.trinity.edu/advancement

ALUMNET
Alumni Connections

Please stay connected with us! We now have a LinkedIn group called “Trinity University Chemistry Department”, along with a Facebook group called “Trinity University Chemistry Department Alumni and Friends”. Please join!

We also have an email distribution list called chemalum@trinity.edu. Please contact Dr. Pursell (cpursell@trinity.edu) to join.

Finally, if you would like to contact any of the faculty directly, here are their emails:

Bert Chandler bert.chandler@trinity.edu
Christina Cooley ccooley@trinity.edu
Laura Hunsicker Wang laura.hunsickerwang@trinity.edu
Corina Maeder cmaeder@trinity.edu
Chris Pursell cpursell@trinity.edu
Adam Urbach adam.urbach@trinity.edu
DEPARTMENTAL SEMINARS

SPRING SEMINARS

Jan 21  Presentation of Summer Research Opportunities

Feb 4  Julia Chan (UT Dallas)
   “Adventures in Crystal growth of Rare Earth Intermetallics with synergistic Magnetic and Electrical Properties: structural complexity to Simplicity”

Feb 11 Jani Ingram (Northern Arizona)
   “Exposure to Uranium and Arsenic among the Navajo”

Feb 18  Presidential Inauguration Activities - A Trinity Experience

Mar 3  Banglin Chen (University of Texas, San Antonio)
   “MetalOrganic frameworks (MOFs): Platforms for Multifunctional Materials”

Mar 31 David Barondeau (Texas A&M University) “Structure and Mechanism of the Human Fe-S Cluster Biosynthetic Complex”

Apr 8  Victoria Tang (Fellow and Medical Director of the Surgical Wellness Program at the University of California, San Francisco)
   “Individualizing Surgical Care for the Older Adult”

Apr 14  Pat Farmer (Baylor University)
   “Cu ionophores that induce rapid apoptosis in melanoma cell culture”

Apr 28  Rick Russel (University of Texas, Austin) “Into the fold: How helicase proteins function as general RNA chaperones”
FALL SEMINARS

Sep 1    Awards Ceremony Welcome Back Social

Sep 15   Caleb Martin (Baylor University)
         “Going from Anti-Aromatic to Aromatic: The Synthesis and Properties
         of Boron-Containing Heteroarenes”

Sep 29   Guido Verbeck (University of North Texas)
         “True one-cell chemical analysis: Using direct analyte probe
         nanoextraction-coupled to mass spectrometry to probe chemical
         differences between healthy and cancerous cells.”

Oct 4    Eleanor Gillette (National Institute of Standards and
         Technology)
         “Impact of Structure on Rate Performance and Durability of Lithium Ion
         Battery Electrodes”

Oct 6    Jennifer Faust (University of Toronto) “The Role of
         Water in Organic Aerosol Formation”

Oct 11   Rachel O’Brien (Massachusetts institute of Technology) “Analytical
         Techniques for Complex systems: Exploring the Composition of
         Organic Aerosol Particles”

Oct 20   Gary Brudvig (Yale University)
         “Learning from Nature How to Make Solar Fuels”

Nov 3    Tom Wandless (Stanford University) “Can Chemical
         Biology Help Us Understand and Ultimately Treat
         Human Disease?”
CHEMISTRY CLUB

Officers
Pooja Bollampally - President
Rachel Shepherd - Vice President of On Campus Events
Christian Schreib - Vice President of Social Events
Julia Matsuo Dapaah - Vice President of Outreach
Camille Potts - Vice President of Green Chemistry
Enrique Garcia - Treasurer
Tam Nguyen - Secretary
Jemima Sackey-Addo - Historian

In 2016, Chemistry Club worked toward expanding its influences on both the Trinity and San Antonio Community. The significant effects on the Trinity students and Chemistry Club members were observed as results of large on-campus events, social engagement, and community outreach. On-campus events include Mole Day and Scientist Day, which highlight a specific theme or scientist in a series of high-energy educational demonstrations and explanations, as well as more interactive events such as study nights and chapter meetings during which upperclassmen students assist and communicate with lowerclassmen regarding their introductory Chemistry and science classes. We encourage and promote inter-organizational communication and cooperation through combined socials with other
academic groups such as the American Society for Biochemistry and Molecular Biology (ASBMB). We continue to be involved in the San Antonio community through our active presence at the Children's Museum (The DoSeum). Our chapter of the American Chemical Society (ACS) continues to be recognized on a national level with an Excellent Student Chapter commendation for the 2015-2016 school year by ACS with further aspirations to expand the club with our new 2017 officers!
STUDENT RESEARCH ACTIVITIES
Bachrach Research Group

Caileen Tallant, Clemente Guzman, Dr. Steven Bachrach, Nicolas Morrison
Zeina Zayat, Skylar Cho

Caileen Tallant (2016) continued her examination of wider ExBox analogues that might select for non-linear polycyclic aromatic hydrocarbons.


Nick Morrison (2018) examined an expanded ExBox that could serve as a host for two stacked polycyclic aromatic hydrocarbons.

Skylar Cho (2018) continued her studies of cyclometaphenyles that might adopt a Möbius conformation. She will present this work at the San Francisco National ACS Meeting in April 2017.

Nico Dwarica (2017) loves parties …. especially Ni nanopartie, developing new synthetic methods to oleic acid and oleyl amine stabilized Ni nanoparticles and supported catalysts. Grad school will literally be a four letter word for Nico; the only question now is which word.

Todd Whittaker (2017) continued his work on the Preferential Oxidation of CO in Hydrogen (PROX) over Au catalysts, trying to understand the key factors in making this reaction selective. He also managed to work his phone game playing schedule around duties as the starting goalkeeper for the Trinity Men’s Soccer team, which made the sweet 16 of the NCAA Division III Tournament this year.

Alex Huther (2016) worked hard to finish school and graduate … so that he could continue to make metal oxide supports and Au parties close to full time for a couple months. He’s now applying to med schools and enjoying life as he learns some IR spectroscopy and tries to get his parties to hydrogenate octyne and oxidize sec-phenethyl ether.
Heidi Krause (2017) suffered the pain of sharing a lab with Alex and Todd for a second summer while she developed Hammett relationships for phenylacetylene hydrogenation over Au catalysts.

Meagan Pollock (2017) and Christine Peterson (2018) – worked together during the summer examining the infrared spectral response associated with the adsorption of carbon monoxide and hydrogen on gold/titania catalysts.

Mariel Santos (2018) studied catalyst pretreatment effects on benzyl alcohol oxidation, and presented her research at KAUST this fall.

Annette Tombo (2017) worked on the benzyl alcohol oxidation project and is looking at grad school opportunities abroad.
Manasa Sarma and Jonathan Palmer (2019) worked on the chemical synthesis and biological analysis of reactive oxygen species activatable prodrugs of stress-responsive signaling pathway activators of celastrol and AA147 as a strategy to treat protein misfolding diseases. Manasa plans to continue research in academia as a laboratory technician or work in industry on drug discovery after graduation. Jonathan is continuing the project this summer and plans to attend medical school.

Zachary Allen (2017) and Jemima Sackey-Addo (2018) worked on the development of a fluorogenic polymerization amplification assay as a new platform for the detection of infectious disease. Zachary and Jemima will continue work on the project this upcoming summer and both plan to attend medical school.
Liezelle Lopez (2016) has worked on the Sco and Cuₐ project. She isolated the mixed disulfide intermediate (MDI) and worked to find conditions under which it will crystallize. Liezelle also continued to probe the stability of the apo and holo protein by denaturing the protein. Liezelle is attending medical school at Baylor School of Medicine in Houston.

Michael Dybdal-Hargreaves (2016) continued to work characterizing the family of mutants that will alter reduction potential by changing distant charges on the protein. We began to make mutants that remove negative charges to establish if the reduction potential goes up, which would be predicted since removing positive charges makes the reduction potential go down. Michael is attending medical school at the University of Texas Health Center, San Antonio.

Ambrose Paige (2017) has continued to work with H134C. We have finally be able measure the reduction potential, in collaboration with Dr. Hoke
(Berry College) and are now analyzing the structure of H134C to rationalize the reduction potential. Ambrose is intending to get a Master’s degree in chemistry.

Rachel Shepherd (2017) has continued to characterize the double mutants, L135R/G156S and L135E/Y158F in order to show that the changes in potential are additive. She has used DEPC modification and crystallization to characterize these mutants and we have collaborated to measure the reduction potentials of the mutants. Rachel will be attending graduate school.

Molly Hogsett (2017) is continuing to work on the proteins where we have altered distant charges to look at the effect on the reduction potential (with Janett). She has been characterizing the mutants using isoelectric focusing gels, low wavelength CD, and chemical modification by DEPC. She has also been working on analyzing the pH-dependent CD data using multiple wavelengths. Molly plans on attending medical school after taking a gap year.

Taylor Devlin (2018) has continued to work on the CuA project, where she has been exploring the reactivity of the ligating histidines. We have been using chemical modification using DEPC so show that the protein is reactive. We have made a mutant of the protein that removes all of the histidines that are not ligated to the cluster, and the protein still shows reaction with histidines. She has also been working on understanding, through proteins used as controls, that the DEPC reaction with ligating histidines is unique to Rieske and CuA and is not a general property of metal-ligated histidines. Taylor was selected as a Beckman Scholar in May 2016. Taylor intends to go to graduate school.

Janett Muñoz (2018) joined the lab in summer 2016. She has been working with Molly on expressing, purifying and expressing the mutants that alter distant charges and understanding the effects that these mutations make on reduction potential. She has been characterizing these mutants using chemical modification with DEPC, low wavelength CD, and finding the pI using isoelectric focusing gels. Janett is a McNair scholar.

Claire Steinman (2018) continued to work on purifying and characterizing the MBA-modified protein during the academic year. She has been working on writing the manuscript for this work as well.
Victoria Henderson (2019) joined the lab in fall 2016. She has been trained in expression, purification and characterization of protein. Her project will be a new direction in the lab. She is going to probe how the reduction potential of the Rieske protein, within Complex III, correlates with formation of reactive oxygen species (ROS). Toward this end, we will be isolating and purifying both the isolated Rieske and Complex III from yeast, which is new to our lab. She has begun working on cloning the Rieske gene from yeast that will be used to complement a yeast strain that has the Rieske gene deleted. Victoria plans on attending graduate school.
Last summer continuing student Truongan Nguyen (2018) and new student Tam Nguyen carried out research in my laboratory. The two main objectives were to complete a third round of amber heating experiments and to carry out the first carbon-13 NMR experiments on a study set of amber. In the summer of 2015, Truongan Nguyen had carried out amber heating at two temperatures. We decided we needed a third, higher temperature before the results were publishable. He completed this set of experiments with the help of Tam Nguyen. In addition, Truongan Nguyen began a series of synthetic experiments to synthesize a dimethylpiperidine derivative for conformational studies. These experiments are ongoing.
Emily Bowman (2016): Emily graduated in May and stayed on as a research technician. Her project has focused on fluorescently labeling Dib1 and performing splicing assembly assays. In August 2016, Emily went with Christian Schreib to Ann Arbor, MI to work with our collaborator performing single molecule fluorescence experiments examining Dib1 interactions with splicing components. Emily will apply to MD/Ph.D. programs this year.

Camille Potts (2019): This was Camille’s second year in the research lab. During the summer, she mastered protein purification and CD analysis of mutant Dib1 proteins. She has now joined the single molecule project along with Christian Schreib and Emily Bowman, and she went to Ann Arbor, MI in January to perform single molecule experiments. Camille plans to attend graduate school.

Christian Schreib (2018): This was Christian’s third year in the lab and his second summer. This year, Christian developed a fluorescent native gel based
spliceosome assembly assay. He has also continued working on the single molecule fluorescence project and traveled to Ann Arbor twice to perform experiments in our collaborator’s lab.

**Danyal Tahseen** (2019): Danyal joined the lab in the spring and stayed for the summer. During the summer, he purified Dib1 and performed autocleavage assays where he examined whether Dib1 has the ability to self-cleave. To follow his interests, Danyal joined Dr. Cooley’s lab in the fall. Danyal plans to attend medical school when he graduates.

**Fahad Zaman** (2017): Fahad continued his work in the summer performing mutagenesis to construct Dib1 mutants and purifying these mutants. Fahad plans to go to dental school.
Dr. Andrew Bockus, Amy Grice, Emily Babcock, Jordan Koeller, Zoheb Hirani, Elena Boms, Aamuktha Karla, Dr. Adam Urbach, Violet Urbach

Amy Grice (2017) worked in the summer and fall to characterize the structural and binding properties of a chemically modified insulin derivative. She also helped to finish our paper including her imaging and cell permeability work on a cucurbit[7]uril-tetramethylrhodamine conjugate.

Zoheb Hirani (2019) worked through the entire year to synthesize a library of 342 tripeptides, characterize their purity, yield, and identity, and screen them for binding to five different synthetic receptors, three of which are from a collaborator, Lyle Isaacs.

Emily Babcock (2019) worked in the spring and summer to synthesize a library of 75 penta- and hexapeptides, characterize their purity, yield, and identity, and screen them for binding to a synthetic receptor. She worked in the fall to develop a multivalent binding assay.

Jordan Koeller (2019) worked in the summer to design and synthesize a series of mono- and divalent ligands and test their binding to a polyvalent synthetic receptor.
Elena Boms (2019) worked in the summer to synthesize a series of linear and cyclic peptides and test their binding to a synthetic receptor.

2016 SUMMER UNDERGRADUATE RESEARCHERS IN CHEMISTRY

1st row: Manasa Sarma, Janet Muñoz, Rachel Shepherd, Zeina Zagat, Skylar Cho, Aamu Karla, Chris Pursell
2nd row: Jemima Sackey-Addo, Laura Hunsicker-Wang
3rd row: Camille Potts, Taylor Devlin, Molly Hogsett, Mariel Santos, Jordan Koeller, Jones Bruno
5th row: Emily Bowman, Danyal Tahseen, Christina Cooley, Nico Dwarica, Christine Peterson, Elena Boms
6th row: Corina Maeder, Julia Torres, Daniel Elizondo, CJ Guzman, Calieen Talent, Brittany Long
7th row: Connor Lenihan, Steve Bachrach, Christian Schreib, Zoheb Hirani
8th row: Annette Tombo, Truongan Nguyen, Nick Morrison, Bert Chandler
9th row: Alex Huther, Joe Lambert, Todd Whittaker, Adam Urbach
STUDENT RESEARCH PRESENTATIONS, Undergraduates indicated by asterisks


Caileen Tallant* and Steven M. Bachrach, “Exploring Wider ExBox⁴⁺ Analogs,”

Ann Andrews,* and Steven M. Bachrach, “DFT Study of Chiral Organic Superbases,”


Truongan Nguyen* and Joseph B. Lambert, “Effects of Heating on the Molecular Structure of Amber”

Experimental Biology Conference, San Diego, CA April 2016

Emily Bowman, Cody A. Hernandez, Christian C. Schreib, Amber Lucas, and C. Maeder, “Genetic and Biochemical Studies on the Role of Essential Protein Dib1 in Pre-messenger RNA Splicing”

Liezelle Lopez* and Laura Hunsicker-Wang “Structural and Functional Characterization of the Sco Protein from Thermus thermophilus”

Gulf Coast Undergraduate Symposium at Rice University, Houston, TX, October 2016

Zoheb Hirani,* Emily Babcock, and Adam R. Urbach “Exploring Sequence Effects in Cucurbit[n]uril-Peptide Interactions”

Rachel Shepherd* and Laura M. Hunsicker-Wang “Changes in Reduction Potential of the [2Fe-2S] Cluster of the Thermus thermophilus Rieske Protein Using Multiple Non-Covalent Interactions”


Taylor Devlin* and Laura M. Hunsicker-Wang “Investigating the reactivity of the ligating histidines at the CuA site of Cytochrome c Oxidase”
GRANTS FOR EDUCATION AND RESEARCH


Dreyfus Foundation - Jean Dreyfus Boissevain Lectureship for Undergraduate Institutions, $18,500 (2013 - 2016).

The Welch Foundation “Chemistry at Trinity University: Research as the Key to Chemical Education”, $120,000, (2015- 2018).

Dreyfus Foundation - Jean Dreyfus Boissevain Lectureship for Undergraduate Institutions, $18,500 (2013 - 2016).

FACULTY RESEARCH GRANTS

Michelle Bushey

Bert Chandler

Inaugural Research Corporation for Science Advancement SEED Award: “Metalloenzyme-Inspired Heterogeneous C-H Activation Catalysts” $50,000 2016 - 2018.

Laura Hunsicker-Wang
Arnold and Mabel Beckman Foundation, “Beckman Scholars Program” PI: Laura Hunsicker-Wang
$130,000 (2016-2019)


J. B. Lambert

Corina Maeder


Chris Pursell

Adam Urbach

Research Corporation, “LEAD: Preparing the Path to Professor at a Primarily Undergraduate Institution” $25,000 (2016-2017)

National Science Foundation “RUI: Targeting the Terminus for Site-Specific Recognition and Labeling of Proteins” $330,000 (2013-2017)

Welch Foundation, “Protein Recognition and Labeling via Supramolecular Protease Inhibition” $225,000 (2013-2016)
REPORT FROM THE FACULTY AND STAFF

Steven Bachrach
The 2016 year started in the usual way for me. I taught the first semester of organic chemistry, wrote up a paper on work performed by Zeina Zayat from the previous summer, and continued to perform my duties as Assistant Vice President for Special Projects. Over the summer, I worked with five great students. As usual, we ate at a number of excellent restaurants and made significant progress in all of the projects.

But, at the end of the summer, Carmen and I moved to Long Branch, New Jersey where I took on the position of Dean of the School of Science at Monmouth University. This has been a great experience so far, and I am really enjoying the challenges of leading four science departments and more than 60 full-time faculty.

I do miss everyone at Trinity University. I had a wonderful experience working with terrific students and fantastic colleagues within the Department of Chemistry. On a day like today (March 3), where I look out my window to see a heavy snowstorm, I do recall the beauty of the warm March days and wonder what it would be like to be wearing shorts and eating BBQ. If you are ever in New Jersey, New York City, or Philadelphia, Monmouth University is just an hour away and I would welcome a chance to show you around my new home. I want to thank everyone at Trinity for making my 17 years there so memorable, and I wish you all the best in your future endeavors.

Michelle Bushey
After 26 years of dedicated service to the chemistry department and Trinity University, Professor Bushey retired and has started a second career as a program officer at the National Science Foundation.
Bert Chandler
I’m pretty glad to have 2016 in the rear view mirror - swing by for a cocktail sometime, and I’ll tell you all about it. I did make it to Bend, OR for a short vacation that included a trip to Crater Lake, which was beautiful. I learned a lot from being chair for a year, mostly that I’m pretty happy not being chair. 2016 was a big year of transition for the department, and I’m still adjusting to the role as one of the most senior colleagues in the department. That really can’t be good for anybody.
Research continues to go well, and over the past 2 years I had one of the most cohesive research groups I’ve had in a long time. Almost everyone is graduating this year, so I’m now trying to reload. Fortunately, there’s a new postdoc in town and I have a student staying on to do research for a year or two before going to grad school. We were very excited to get a paper out in Nature Chemistry last year, and a patent filed on the preferential oxidation of CO for cleaning up hydrogen. Who knows if anything will come of it, but it was fun to learn a bit more about that whole process. I’m continually impressed with all the things our former students are doing, and always enjoy hearing from everyone. Keep us posted on all your doings!

Christina Cooley
This year has been such a whirlwind but I have enjoyed (most) every minute. Having my own lab and doing research full-time this past summer was truly a dream come true. We made some great progress developing our fluorogenic polymerization assay and we all learned so much—me especially on how to be a principal investigator and mentor.
I have been staying busy with grant writing and was thrilled that my first grant was funded and will start in 2017 – an ACS Petroleum Research Fund Young Investigator Grant. We are continuing to push both projects forward during the academic year, however I particularly am looking forward to this upcoming summer. I am realizing just how critical the summer months are for making substantial research progress when there are so many demands on your time.
Teaching is an absolute joy, and I have now taught the entire Organic Chemistry sequence here at Trinity (both lectures and labs). As I am continually growing as a new professor I am seeking to make improvements in my teaching and in the curriculum so that we can provide the best possible organic chemistry experience for the students. This year I have also been introduced to more of the service and other aspects of this job (such as advising and mentoring students) that require so much time and attention. I enjoy every part of it, even though sometimes I feel like it is impossible to stay on top of everything at once. I know it will only continue to get busier as time goes on, but I am up to the challenge and excited to see what the future holds.

Home life is great but also busy. My husband Scott works from home in sports media and stays home with Cohen and Claire, our now 4 and 2 year olds. They are sweet kids but really keep us on the go! We are all enjoying being a part of the Trinity community and living in San Antonio. We are planning a move to the north side of town soon and are looking forward to getting settled and Cohen starting school (pre-kindergarten) in the fall.

Robyn Hodgkins

As a Trinity chemistry alumna (’05), it was a delightful return to campus when I joined the chemistry faculty in the fall of 2016. I taught one section of General Chemistry lecture and two sections of Lab Methods in Organic Chemistry. Having been away for just over 10 years, the new science facilities and gathering spaces are a welcomed changed from my class days in Moody. I have enjoyed being back in San Antonio and re-exploring the city.
In the spring I taught Biochemistry II, the seminar course and a new course for me, Neurochemistry. Neurochemistry is taught with Jimmy Roberts in Biology and was such a wonderful course to be part of. I am fascinated by the chemistry of the brain. In the fall I taught Biochemistry Lab, General Chemistry and the seminar course.

These classes have all gone really well and I have enjoyed teaching all of them.

Research is going well and we are heading in new, exciting directions. First, we have begun to ask if we can observe the same reactivity of ligating histidines to diethyl pyrocarbonate that we saw in the Rieske protein in other proteins. We have reacted the CuA protein, which has a dinuclear copper site and have some exciting preliminary data that indicate that the ligating histidines might be reactive. We are also taking our deep understanding of the reduction potential of Rieske and starting to apply it to a new system. I have a hypothesis that small changes in reduction potential of Rieske, specifically if it is a relatively small amount, may lead to increased reactive oxygen species formation in Complex III. In order to test this hypothesis, we need to move to working with a yeast system, which we have begun to do. All the while, we are finishing up several studies in the lab and have a series of papers to write. It is an exciting time.

My oldest daughter Lilian is about to turn 10 years old. I can’t believe that she is getting that big. She is very intelligent and a gifted dancer. For the first time this year, she is part of the competitive dance team at our studio and is doing a fantastic job, especially for her first year. She has received two “runner up” scholarships for dance academy programs this summer. My youngest daughter Lauren is also growing up very fast. She is now in kindergarten and is learning to read. She is extremely intelligent and continually amazes me at all the details that she can remember. She is also a dancer and is really enjoying the classes at the dance studio. David has been promoted to a wealth manager I and continues to enjoy working at USAA. He would love to have more time to play golf, but between work and the girls and I, he is pretty busy. I am still heavily involved at my church. I am a praise band member, director of the children’s choir and have been acting as the youth director. I too keep plenty busy! Overall, it has been a great year and I look forward to the next one!
Three papers were published and one is in press, cited below. The first paper on the structure of the mineral stantienite revised its classification from a type of amber to a type of coal, altering a classification that has lasted for 150 years based solely on qualitative characterization. The review in the Graham Webb series covered the application of solid state nuclear magnetic resonance spectroscopy to all forms of materials of cultural interest. Finally, based on work by Trinity undergraduate Connor Johnson, we published the first molecular characterization of exudates from the rare sources cycads, gingko, gnetophytes, and pteridophytes, all ancient plant forms.

At present I am engaged with two co-authors in preparing the second edition of our 2004 book “Modern Nuclear Magnetic Resonance Spectroscopy: An Introduction to Principles, Applications, and Experimental Methods.”

Our personal travels took us to the archaeological and cultural sites of Myanmar (Burma), the Society and Marquesas Islands, Quebec City, central California, and Nevada.


Brittany Long
My first full year of teaching at Trinity has been an incredible experience! In the spring I taught the Physical Chemistry courses (CHEM 3335, 3135) and a few sections of General Chemistry lab while Dr. Pursell was away on sabbatical. I spent a great deal of the summer working on redesigning the Analytical chemistry lecture and lab. I was able to implement 9 new laboratory experiments. This was a challenge but one I enjoyed very much. I also spent the summer participating in the summer research program and doing research with Dr. Chandler’s group. I very much enjoyed teaching and interacting with the students and getting to do some spectroscopy again. In the fall I taught Analytical Chemistry (CHEM 3432) for the first time. It has been a truly amazing year and I look forward to the next one!
Corina Maeder

It’s been another busy year, but I’m getting the feeling they all will be busy! This past year, I taught two sections of Biochemistry I in the spring. In the fall, I taught two sections of Introductory Chemistry (CHEM 1300) and a General Chemistry Lab. Working on Introductory Chemistry was a lot of fun. Bert Chandler and I joined forces to modify the class. We constructed a more active learning class using a Process Oriented Guided Inquiry Learning (POGIL) textbook. It was great to see these first years adapt to the expectations of college. The fall semester was also the first time I advised a first year group. It was exciting to meet these students during their first days on campus, and I look forward to seeing what their future holds.

In the research lab, I had a wonderful group of students, and we are chugging away at our projects. We have several lines of inquiry to examine how the splicing protein Dib1 interacts with the spliceosome, an essential component in gene expression. Our new collaboration to perform single molecule fluorescence experiments with the University of Michigan, Ann Arbor is in full swing. This past year, two student groups went to Michigan to perform experiments. We plan to continue this collaboration with 2-3 trips a year. I’m looking forward to the wealth of information we can learn from these experiments. It was also a great year for funding, as we were awarded Welch, NIH R15 and San Antonio Area Foundation grants.

At home, this was a big year for my family. Gerard settled into his first year as a tenure-track faculty member in Biology, and Ben (9) and Maddy (7) are now attending the new Trinity lab school, the Advanced Learning Academy. This school was built as a partnership between Trinity and San Antonio Independent School District, and started this past fall. Overall, I look forward to seeing what the next year holds for us. It will surely be as busy and exciting as this one.
As y’all know from last year’s report, Kathy and I were on academic leave in Japan 2015-16 (returning to the States in May 2016). I was conducting research at the Okinawa Institute of Science and Technology, Graduate University. The research unit (Nanoparticles by Design) was an interdisciplinary group with researchers from all over the world. It was a great experience and I learned a great deal. Our time in Japan also gave us the opportunity to spend lots of time with our two oldest grandkids (Benjamin and Gracelyn, now 5 ½ and 3 ½; our son Timothy was stationed in Okinawa with the U.S. Marines), and to travel that side of the world. These travels included visiting old graduate student friends in Taiwan and Hong Kong (both chemistry professors), our good friends back in New Zealand (from our 2005-06 sabbatical there), friends teaching English in China (including Beijing), and the Japanese mainland. We really enjoyed the mainland, including Kyoto and Tokyo. While in Tokyo I had the opportunity to visit the Tokyo Metropolitan University and Professor Haruta, one of the founding fathers of gold nanoparticle catalysis! While our time away in Japan was fantastic, is was good to return home.

In the summer, I enjoyed doing research with students and colleagues, including two separate projects – one with my chemistry colleague Bert Chandler, examining the physical and chemical properties of gold nanoparticle catalysts; and one with my engineering science colleague, Peter Kelly-Zion, studying the relative contributions of vapor diffusion and natural convection on the evaporation of hydrocarbon thin films (i.e. sessile droplets). Both of these projects have received external funding and have produced a number of publications. Most importantly, this research has given students in both chemistry and engineering science an opportunity to grow intellectually as they apply themselves in the research laboratory.

I continue to teach the physical chemistry courses and serve as chair of the department. I still tell the students that I volunteer to teach and the University pays me to grade! We continue to have good students and good chemistry colleagues, for which I am thankful.
Adam Urbach

It was a year of transition. In March, I rotated off as chair of the faculty senate, and a light teaching load in the spring enabled me to turn my attention to research for the first time in several years. Dr. Andy Bockus and I wrote a comprehensive book chapter on the molecular recognition of aromatic peptides and proteins in nature and by design for an RSC monograph edited by Darren Johnson and Fraser Hof. As an intellectual exercise, it was great to work with Andy to explore the literature more fully and to place our research into a broader context. The spring ACS meeting also included a three-day event in honor of the 70th birthday and illustrious career of Prof. Peter B. Dervan. It is truly an honor to have been mentored by Peter and to be part of such a terrific group of alumni. This spring/summer, Elena Boms (’19) and Aamuktha Karla (’20) joined the group, and along with Emily Babcock (’19), Amy Grice (’17), Zoheb Hirani (’19), and Jordan Koeller (’19), we had a full house. It was a fun summer, and on our summer ditch day, we went rock climbing at Reimer’s Ranch. I was on academic leave in the fall and enjoyed the unstructured time to write papers and grant proposals, work with my research group, and spend more time with family. Please don’t hesitate to drop a line and let me know what you’re up to.

Concerning the rest of the family, Janet (31) is still living in Birmingham, AL, has a 20 month old, and is expecting twins in July! We are super excited. Timothy (28) is now a captain in the Marines and is living in Oregon, serving as an officer recruiter at Universities in Oregon and Alaska. He and his wife Kristine (TU graduate class of 2011) just had their third child in September. Jacob (22) is a senior at Trinity University and is following in the footsteps of his two older siblings and a sister-in-law who all graduated from Trinity! As always, my better half, Kathy, is doing great and continuing to hold us all together.
Marilyn Wooten

It was a year of change with new and finalized projects. The spring semester saw the inaugural trailer sections of General Chemistry lecture and corresponding lab. It was interesting to teach these classes to a second cohort of students within the same academic year in addition to the Advanced Chemical Principles Laboratory. Over the summer, I had the pleasure of attending a workshop on Teaching Guided-Inquiry Organic Labs. Upon my return while mentoring an American Chemical Society SEED student, we worked to test some of organic chemistry experiments learned in the workshop. In the fall, as we continued implementing the trailer sections and corresponding lab, it was all about organic chemistry as I had the opportunity to teach the lecture in addition to the Chemical Synthesis Lab. Lab coordination was challenging with the increase in lab courses, though our wonderful instructors made it go smoothly. Student advising continued as usual. Two projects from the water condensates collaboration with Diana Glawe and electrochemical application of gold nanoparticles culminated with papers. In spring I joined Michelle Bushey on her research of the frescos in the Alamo and we look forward to seeing the results it will yield.

On the family front it has been the start of major transitions for my youngest sons. Paul started his last high school year as well as college applications. Zachary, a senior at Trinity, in a similar vein applied to graduate schools. Alexandre continues working as he considers going to graduate school as well.
PART-TIME FACULTY AND POST DOCTORAL ASSOCIATES

Andrew Bockus

Dr. Andrew Bockus worked in Adam Urbach’s laboratory this year. They collaborated to write a comprehensive book chapter, and to shore up, revise, and publish a paper describing the molecular recognition of proteins in complex mixtures, and a paper describing the sensing and imaging properties of a host-dye conjugate. Dr. Bockus left in December to join Circle Pharma in northern California. He was an outstanding collaborator and educator and will be missed.

James Bruno

Dr. James Bruno, an actual engineer, joined the lab in the spring and began working with students on the alkyne hydrogenation projects. Rumor has it he needs to up his Risk game.

Wei Li

Dr. Wei Li joined us as a chemistry lab instructor.

Tian Tian

In spring 2016, I taught advanced analytical (Chem 4242) and enjoyed the course projects with our talented seniors. I gave a poster presentation on “efficiency study of porous polymer monoliths with different mobile phase and stationary phase compositions using capillary electrochromatography and scanning electron microscope” at ACS national conference in San Diego. I participated and really loved the curriculum redesign discussion and activities led by the chemistry department.

In summer 2016, I supervised a high school student working on ACS SEED project. I also worked with a colleague on analytical lab redesign: to find appropriate labs to replace the capillary electrophoresis and electrochemical analyzer ones. The last thing I accomplished was research lab cleaning (I think it might be as much work as starting a research lab). Due to family reasons, I moved to Indiana and currently I’m a visiting assistant professor at Earlham College. I will always remember and appreciate my experience at Trinity with all the colleagues and students.
EMERITUS FACULTY

Nancy Mills

Mark and I continue to enjoy retirement. There are so many wonderful trails close to our house although the abnormally rainy fall and winter have curtailed that activity a bit. Mark hiked the Colorado Trail, from Denver to Durango, approximately 500 miles. My sisters and I joined him for 2 ½ days near Silverton, Colorado. Our section was 35 miles and almost killed me. I am glad that he enjoys thru hiking and very happy to let him do this without me.

I am picking up all the pleasures that I put on hold for the last 3 decades. Most recently I have joined two singing groups. The Women's Chorale Society is a city wide group with two concerts a year, a combination of serious work (read Masses) and more popular work and I have thoroughly enjoyed the demands of doing music publically. I have also joined a neighborhood group of women who just enjoy singing harmony together, which is also fun. I am taking classes at the Osher Lifelong Learning Institute, primarily in world affairs, and will be teaching a lecture on, you guessed it, Chemistry and Cooking.

My sisters and I do at least one major trip a year and last year was the UK in June. It was particularly interesting because it was just before the Brexit vote and of course before our elections. Their comments about the EU and questions about Trump had some striking similarities. After several days in London, we rented a car and set off for the rest of England, Scotland, and Ireland. Two comments about driving in the UK, which thankfully my sister Barb was willing to do: Distances in the UK, while short on a map, are actually much longer than one might think, and roundabouts are amazing. We found that we could just go around and around until we figured out where we were. It was a wonderful trip.

And last, but not least, we became grandparents. Our daughter Carrie and her husband Thomas still live in San Antonio, and they have now been joined by a son, Milo Robert, born in April. We were here for the birth, I was back in July and we saw them in August in California, Thanksgiving in Nebraska, and Christmas in San Antonio. He is a sweet little guy, with a lovely
disposition. Reminds me of his mother. Our son Will worked on a congressional race in California, then was in charge of a hotly contested state assembly race in California, and has recently moved back to Washington, DC. It is interesting to hear his comments about life in DC with a change of administrations.

I continue some activity in chemistry, I'm in my last year on the PRF Advisory Board of the American Chemical Society, run the Undergraduate Award for the Division of Organic Chemistry, and am the chair of the External Advisory Committee for the South Carolina INBRE program of the NIH. I am also the secretary of the board of directors for our local science museum, the Science Factory.

We have a lovely home in Eugene, with space for guests so whenever you are in the area, please stop by. My email address is still nmills@trinity.edu.

Ben Plummer

Ben and Gail traveled more this year because we were healthy without major medical issues. We flew to Madrid first class through a reduced airfare with Road Scholar. We could get used to that form of travel! Two days in Madrid provided the opportunity for a rushed visit to the Prado. The tour group boarded the high-speed train to Seville. The train reaches speeds of 150 mph with a surprisingly smooth ride. A coach took us to Grenada, Andalusia where we visited the famous Alhambra. After exploring Seville the group boarded the 400-passenger Aegean Odyssey to cruise the Mediterranean. Embarkation started on the Guadalquivir River. We sailed into the Atlantic and through the Straits of Gibraltar. The tour visited inside the “Rock”. Close encounters occurred with Barbary macaques that freely roam there. We sailed into the Tyrrhenian Sea and docked near Pisa Italy. A coach took us to see the
Leaning Tower and associated cathedral. The cruise docked in Italy near Rome. This was our fourth visit there. The exterior of the coliseum is cleaned and improved.

In late July we joined a Road Scholar tour in Santa Fe. The tour included enjoying two operas “Rigoletto” and Donizetti’s “The Daughter of the Regiment”. Lectures prepared us for a better understanding of the dramas. The Santa Fe open-air opera theater is a marvel of sight and sound.

In October we joined a WWI tour to northern France and Belgium. This year was the centenary of WWI that began in 1915. We flew in and out of Paris before the terrorist attacks. Unique country memorials to the fallen were visited. The architectural monuments have a transcendent beauty. We walked in preserved trenches near Flanders Fields. History documents the horrible conditions that soldiers endured in trench warfare.

Finally, we invited 80 guests to a local motel to celebrate Ben’s 20th Leap Year Birthday. He finds it difficult to comprehend that he has lived for 80 years and has been retired from Trinity for 15 years. A joyful family reunion occurred that included twin grandsons Alex and John Clark. We are fortunate and proud that grandson Adam Litch is now a second year student at Trinity University.

Ben joins retired colleague John Burke to enjoy regular golf outings at a local course.
CHEMISTRY STAFF

Matt Hymer

As CSI Laboratory Manager, my work days are fast and intense. From performing routine lab manager duties to dealing with last minute request, I can honestly say there is never a dull moment.

My goal has always been to prepare the teaching labs to a high standard and to ensure that the research labs have the supplies required to succeed. I have set many goals for 2017 and look forward to the future at Trinity and will embrace the many changes and challenges that are on the horizon.

My wife Beverly and I have two sons, Jackson age 11 and Gavin age 8. Beverly is a fifth grade teacher in San Antonio and my sons are very active in school and in sports. Both Jackson and Gavin have qualified for the US Kids World Golf Championship in Pinehurst, North Carolina this summer. My hobbies include golf, landscaping, reading, home improvement projects, and personal fitness.

Alexis Baum

My name is Alexis Baum and I am a CSI Laboratory Technician. I primarily work in the Chemistry Department setting up chemistry teaching labs and I also maintain the chemical suite. My job title is fairly diverse and it keeps me busy helping and working in other departments in CSI as well. I strive to provide the best support to faculty while they teach and perform research and I am always happy to assist anyone who has questions or needs anything to be done. Some personal information about myself is that I married my husband, Trevor Baum, a year ago and we are both huge animal lovers. There never is a dull moment at our house with two curious ferrets and two playful kitties running about. My hobbies are bike riding, hiking, drawing and painting, and writing on my science fiction novel.
FACULTY PUBLICATIONS, undergraduates indicated by asterisks


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Diana Glawe, Ph.D., P.E.; Marilyn Wooten, Ph.D.; Dennis Lye, Ph.D.
“Quality of Condensates from Air Handling Units” *ASHRAE*, December 2016, 14-23.

Sushma Karra, Marilyn Wooten, Wendell P. Griffith., Waldemar Gorski;
FACULTY PRESENTATIONS AT UNIVERSITIES AND AT SCIENTIFIC MEETINGS

Bert Chandler
“Gold Catalysts for Hydrogen Purification: Mechanistic Tools, Hammett Studies, and a Unifying Mechanism for CO Oxidation over Au” (Invited lecture) University of Notre Dame Department of Chemical and Bimolecular Engineering, October 25, 2016.


Chen, Z; Tibbitts, L; Newell, J; Kumar, G; Mukhopadhyay, A; Saavedra, J; Pursell, CJ; Janik, MJ; Rioux, RM; Chandler, BD. Hammett Studies for Evaluating Support-Induced Electronic Effects on Au Nanoparticle Catalysts using Benzyl Alcohol Oxidation as Probe Reaction. 16th International Congress on Catalysis, July 2016, Beijing, China.

Chen, Z; Saavedra, J; Whittaker, T; Pursell, CJ; Rioux, RM Chandler, BD; Controlling Activity and Selectivity using Water in the Au-catalyzed Preferential Oxidation of CO in H2. 16th International Congress on Catalysis, July 2016, Beijing, China.

Christina Cooley
“Chemical and Biological Approaches for the Treatment of Protein Misfolding and Aggregation Disease,” (Invited lecture), 251st American Chemical Society National Meeting, San Diego, CA, March 15, 2016.
Laura Hunsicker-Wang
“Translation of chemical biology research into the biochemistry laboratory: Chemical modification of proteins by diethylpyrocarbonate” with Dr. Mary Konkle 251st National Meeting of the American Chemical Society, San Diego, CA Mar 13, 2016

Corina Maeder
Invited Seminars:
Department of Biology, Baylor University, Waco, TX

Christopher Pursell
“CO Oxidation and Preferential Oxidation by Gold Catalysts: the Role of Water”, Tokyo Metropolitan University, Japan, April 2016.

Adam Urbach
Conferences:
“Site-Specific Molecular Recognition of Proteins by Synthetic Receptors” 251st American Chemical Society National Meeting, Inorganic Poster Session, San Diego, CA, Mar. 15, 2016 (poster)
“Molecular Recognition and Sensing of Peptides and Proteins with Cucurbit[n]uril Synthetic Receptors” 251st American Chemical Society National Meeting, Molecular Recognition and SelfAssembly, San Diego, CA, Mar. 14, 2016 (speaker and session chair)
“Sequence-Specific Recognition of Peptides and Proteins” Symposium in Honor of Peter B. Dervan, California Institute of Technology, Pasadena, CA, March 12, 2016 (invited speaker)

Seminars:
Department of Chemistry, University of Georgia
College of Science, University of Texas at San Antonio
Major Instrumentation, Department of Chemistry

Spectroscopy:

Nuclear Magnetic Resonance:
Varian 500 MHz NMR spectrometer (2010)
Varian Mercury 300 NMR Spectrometer (2002)

Circular dichroism

Mass spectrometry

UV-visible spectroscopy

Fluorescence spectroscopy

Atomic emission spectroscopy  Infrared  Lasers
Varian 720-ES ICP-OES (2010)
Nicolet Nexus 470 FT-IR (2002, 2003))
Beckman Fluorescence Detector/Melles Griot Laser (2005)

Microscopy
Jeol 6010LA Scanning electron microscope (2013)
Nikon Eclipse 50i Microscope equipped for tetrad dissection (2014)

Electrochemistry
BAS 100 Electrochemical Analyzer (2004)

Separations Instrumentation:

Liquid chromatography

Capillary chromatography

Electrophoresis
Beckman P A800 Capillary Electrophoresis (2005)
Reactors:

**Microwave**

**Calorimetry**
TA Instruments DSC Q2000 (2014)

Computational:
Dell PC Linux Cluster (2004-2013)

Biochemical equipment:
Sorval RC-6 Plus Superspeed Centrifuge (2012)
New Brunswick Scientific E24 Incubator/Shaker (2007)
Innova 2500KC Refrigerated Incubator/Shaker (2007)
Innova 140 Benchtop Incubator/Shaker (2005)
Biotek Absorbance Plate Reader (2005)

Controlled environment
PLAS-LAB Mini glove box (2014)