

## BRIEF BIOGRAPHICAL SKETCH, ALLEN M. SCHOFFSTALL, 2019

### Professional Preparation:

Franklin and Marshall College	Chemistry	B.S., 1960
State University of New York (Buffalo)	Organic Chemistry	Ph.D., 1966
State University of New York (Buffalo)	Organic Chemistry	Post-doctoral; 1965-1966
University of Illinois (Urbana)	Organic Chemistry	NIH Fellowship, 1966-1967

### Appointments (all in Departments of Chemistry)

University of Colorado (UCCS) 1967-1977	Professor, 1977-; Asst.-Assoc. Prof.,
Emory University, Atlanta, GA 1990	Visiting Professor, 1987-1988; 1989- 1990
University of Virginia, Charlottesville, VA,	Visiting Professor, 1977
University of Maryland, College Park, MD	Visiting Associate Professor, 1975-76

### Publications (2011-Present)

1. Trujillo Marissa; Hull-Crew Clayton; Outlaw Andrew; Stewart Kevin; Taylor Loren; George Laura; Duensing Allison; Tracey Breanna; **Schoffstall Allen**, Green Methodologies for Copper(I)-Catalyzed Azide-Alkyne Cycloadditions: A Comparative Study *Molecules* (Basel, Switzerland) **2019**, 24(5), 973 (1-12); doi:10.3390/molecules24050973.
2. Butler, Christopher R.; **Schoffstall, Allen M.**; Shoemaker, Richard K., Unequivocal proof of structure using NMR spectroscopy in an organic laboratory project. ACS Symposium Series 1221. NMR Spectroscopy in the Undergraduate Curriculum, Volume 2, **2016**, 151-172.
3. Canaria, J. A., **Schoffstall, A.M.**, Weiss, D.J., Henry, R. M., Braun-Sand, S.B. A model for an introductory undergraduate research experience, *J. Chem. Educ.*, **2012**, 89, 1371-1377.
4. Mendes, D. E.; **Schoffstall, A. M.** Citrus peel additives for one-pot triazole formation by decarboxylation, nucleophilic substitution, and azide-alkyne cycloaddition reactions, *J. Chem. Educ.* **2011**, 88, 1582-1585.

### Books

1. Schoffstall, A.M., Gaddis, B.A., Druelinger, M.L. *Microscale and Miniscale Organic Chemistry Laboratory Experiments*, McGraw-Hill, Boston, **2000**, 612 pp., 1<sup>st</sup> Ed., ISBN 0-07-237549-3; **2004**, 659 pp., 2<sup>nd</sup> Ed., ISBN 0-07-242456-7.
2. Schoffstall, A.M., Gaddis, B.A., and Pitman, C.S., *Instructor's Manual and Answer Book for Microscale and Miniscale Organic Chemistry Laboratory Experiments*, McGraw-Hill, Boston, **2000**, 245 pp., 1<sup>st</sup> Ed., ISBN 0-697-41603-8; **2004**, 270 pp., 2<sup>nd</sup> Ed., (online) at <http://www.mhhe.com/physsci/chemistry/schoffstall/index2.html>

**External Scholarly Presentations with Abstracts (2018-2019)** All collaborators are undergraduates except M. L. Druelinger and Scott Iacono.

### Synthesis of quinoxalinyltriazoles

- Clements, Christopher M.; **Schoffstall, Allen M.** From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019, CHED-1405.
- An optimized synthesis was used to prepare functionalized quinoxalines featuring attached 1,4-disubstituted triazoles. Earlier synthetic methods led to the formation of isometrically impure products that were difficult to purify. In the present work, various approaches were used, including a synthesis of a 1,2-dione derivative. and a substituted phenylenediamine were condensed to form a quinoxaline scaffold. This precluded deactivating effects of the quinoxaline ring during intermediate steps of the synthesis. The synthetic quinoxalinyltriazole products and their characterization will be presented.

### Synthesis of symmetrical trisubstituted 1H-1,2,3-triazolopyridines

- Hull-Crew, Clayton J.; **Schoffstall, Allen M.**
- Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019, CHED-1420.
- Symmetrical trisubstituted compounds. have been assembled into a potential drug library focused on pyridine and 1H-1,2,3 triazole moieties. Although they contain pyridine components, these heterocyclic compounds. contain some features that differ from known synthetic drugs. Continuing this line of research, compounds. featuring nitrogen-rich heterocycles and highly substituted aromatic rings were synthesized in acceptable yields using, among other techniques, copper (I) catalyzed azide-alkyne cycloaddition (CuAAC) "click" reactions, confirmed with <sup>1</sup>H NMR spectroscopy and elemental analysis. Compounds. produced will be evaluated for biological viability as drug candidates, and/or further derivatization.

### Construction of a drug candidate library using the copper(I)-catalyzed azide-alkyne cycloaddition and a fluorinated terminal alkyne

- Stewart, Kevin A.; **Schoffstall, Allen M.** Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019, CHED-1410.
- Designing drug libraries is often a crucial first step in the development of pharmaceuticals, for a variety of intended uses, esp. when testing for compounds that may exhibit anti-cancer properties. Synthesizing a wide array of structurally similar compounds allows for high-throughput screening of the drugs against various targets. Such a drug library was constructed utilizing the high efficiency of the copper(I) catalyzed azide-alkyne cycloaddition (CuAAC) and the expedient reaction times of microwave heating. Such reactions were conducted using a variety of org. azides and a fluorinated heteroaromatic ring possessing a terminal alkyne, as the biological activity of organic compounds containing fluorine can be augmented. Purification, when necessary, was performed via recrystallization. The compounds were characterized by IR and multi-nuclear NMR spectroscopy.

### Aryltriazolopolyfluoropyridine reactions with amines

- Outlaw, Andrew D.; **Schoffstall, Allen M.** Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019, CHED-1412.

- Molecules containing a 1H-1,2,3-triazole ring have been associated with a wide range of important inhibitory properties of biological processes. An array of 1,4-disubstituted 1H-1,2,3-triazoles was synthesized using a common aryl-substituted pyridine core to investigate the effects of functional groups on the biological activity of the triazole containing fluorinated pyridines. Nucleophiles such as piperidine and morpholine were substituted at C-2 of the pyridines to determine their effects on the biological activity of the molecules. All compounds were characterized using spectroscopic methods.

### Synthesis of triazolopolyfluoropyridine derivatives

- Taylor, Loren J.; **Schoffstall, Allen M.** Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019, CHED-1378.
- Derivatives of 1H-1,2,3-triazoles have been shown to have biological activities ranging from anti-cancer, anti-microbial, anti-fungal and others. Substituted triazolopolyfluoropyridines have been prepared as candidates for biological testing. This project focused on creating 1H-1,2,3-triazoles from organic azides and terminal alkynes using the conventional and microwave heating synthetic methods. Triazolo esters and amides were prepared with derivatives having amine substituents on the pyridine ring. Purification was accomplished by flash column chromatography and the purified products characterized using spectroscopic methods.

### Reduction of isoxazole derivatives via catalytic hydrogenation compared to reduction using iron powder catalyst

- By Morris, William R.; Schoffstall, Allen M.
- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), CHED-1286.

3,5-Disubstituted isoxazoles were prepared through cycloaddition of organic nitrile oxides and alkynes in one-pot syntheses. After purifying the isoxazole products using recrystallization in ethanol, the isoxazole derivatives were reduced using hydrogenation and the results compared to those from using the reduction method using iron powder catalyst in hexafluoro-2-propanol. Products of the reactions were purified using recrystallization and characterized using spectroscopic methods.

### Synthesis of 1,4-disubstituted triazolopyridine carboxylates

- By Bendesky, Justin; Schoffstall, Allen M.
- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), CHED-1288.

Triazole synthesis via Cu-catalyzed azide-alkyne cycloaddition, commonly referred to as a type of "Click Chem.," has become the preferred method for 1,4-disubstituted 1H-1,2,3-triazole formation, due to its high-yielding and regiospecific outcomes. 2,5-Di-Me pyridinedicarboxylate was selectively reduced at C-2 by reduction with sodium borohydride, followed by tosylation and azidation to prepare for a click reaction. Terminal alkynes including 1-ethynyl-3-fluorobenzene were used for triazole formation. Products were characterized by spectroscopic methods.

### NMR spectroscopy as a component of an advanced organic laboratory project

- By Hull-Crew, Clayton J.; Trujillo, Marissa N.; Outlaw, Andrew D.; Clements, Christopher M.; Zeller, Ashley A.; Taylor, Loren J.; Stewart, Kevin A.; Schoffstall, Allen M.

- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), CHED-0017.

A project is described for the advanced org. lab., specifically for students about to embark on an undergraduate org. research experience. Participants worked independently at their own pace and ran their own NMR spectra. Emphasis for participants was placed on development of skills and being able to carry out procedures described in the journal literature. Benzyl azide and terminal alkynes were cyclized to form 1,4-disubstituted 1H-1,2,3-triazoles by four different synthetic methods by each participant. Participants compared the overall results and decided which method or methods worked best of the four different procedures tested. Overall efficiency of each of the methods was the main basis for comparison, which included factors of yield of pure product, quality of the products based upon NMR spectral data, time necessary for the expt. and ease of work-up and purifn. <sup>19</sup>F NMR data will also be discussed for a comparable set of expts. using fluorinated starting materials.

### **What is undergraduate research and why do it at a predominantly undergraduate institution**

- By Schoffstall, Allen M.
- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), YCC-0001.

Engaging in an undergraduate research experience has become an important option for students at many colleges and universities. In this presentation, we will examine the research enterprise in chem. and biochem. at predominantly undergraduate institutions and consider a series of recommendations aimed at improving the quality and quantity of research in chem. at those institutions. The conversation will include issues important for the faculty, students and institutions.

### **Substitution of fluorinated 1H-1,2,3-triazolopyridines by secondary amines**

- By Trujillo, Marissa N.; Schoffstall, Allen M.
- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), CHED-1422.

Fluorinated pyridines are highly tailorable mols., being particularly susceptible to S<sub>N</sub>Ar reactions. The effect of a triazole substituent on the pyridines and the specific characteristics influencing nucleophilic substitution are described. Piperidine was used as a nucleophile in order to synthesize a potential p38α inhibitor. Fluorinated pyridines readily undergo nucleophilic substitution at the 4-position, but there is less known regarding reaction conditions for further substitution. It is shown that not only does nucleophilic arom. substitution take place readily when the pyridine ring contains a triazole, but the substitution is selective and can therefore be applied more specifically to create novel compds.

### **Synthesis and stereoselective reduction of novel P-38α inhibitors**

- By Maben, Hannah K.; McGrath, Andrew T.; Schoffstall, Allen M.
- From Abstracts of Papers, 257th ACS National Meeting & Exposition, Orlando, FL, United States, Mar. 31-Apr. 4, 2019 (2019), CHED-1357.

Synthesis of two novel, potential p-38α inhibitors, bis-1,3-(4,6-difluoro-4-{4-[quinoxalin-2-ylmethoxy] methyl}-1H-1,2,3-triazol-1-yl]pyridin-2-yl) 5-methyl-6-phenylpiperazine-2,3-dicarbonitrile (I) and 2,6-di(5,6-dimethyl-6,7-dihydro-5H-[1,2,5]oxadiazolo[3,4-b]pyrazin-4-yl)-3,5-difluoro-4-(4-phenyl-[1,2,3]triazol-1-

yl)-pyridine (II) were conducted. The syntheses involve several  $S_NAr$  reactions, a Sharpless "click" reaction, and a mild redn. via sodium borohydride. Upon the synthesis of II, the stereoselective redn. of pyrazines was investigated as well, which afforded dihydropyrazines. The final products along with their derivs. are reported.

### Utilizing chemoselective strategies towards new polymer architectures from fluorinated alkenes

- By Corley, Cynthia A.; Stewart, Kevin; Peloquin, Andrew; Gumireddy, Lionel; Jennings, Abby R.; Knoerzer, Timm A.; Schoffstall, Allen M.; Iacono, Scott T.
- From 24th Winter Fluorine Conference, American Chemical Society, Division of Fluorine Chemistry, Clearwater Beach, FL, United States, January 13-18 (2019), WFC-56.

Many of the desired properties of high use temp. arom. polymers are shared with fluoropolymers. A logical approach would be to incorporate fluorinated functionality into the framework of the polymer that would improve soln. processability of such rigid systems. Recently, we have developed a pool of new fluorocyclic-contg. polymers from fluorinated alkene feedstocks that include poly(aryl ether)s, fluorinated organically modified silica gels, arom.-contg. fluorosilicones, and resins derived from cyanate esters and benoxazines. These unique materials have shown marked improvement in processability, mech. strength, and filler compatibility as hybrid composites while retaining high use temp. in air-rich environments. This work will highlight new synthetic routes for monomer prep., step-growth polymn. methodologies, and processing of these systems.

### Utilization of Hydrosilylation Chemistries with Substituted Aryl/Alkyl Vinyl Ether Perfluoropyridines: Towards a New Class of Fluorosilicone Elastomers

- **Kevin Stewart**<sup>1</sup>, Abby R. Jennings<sup>2</sup>, **Allen M. Schoffstall**<sup>1</sup>, and Scott T. Iacono<sup>2</sup>, <sup>1</sup>University of Colorado Colorado Springs, Department of Chemistry and Biochemistry <sup>2</sup>United States Air Force Academy, Department of Chemistry and Chemistry Research Center
- ACS Polymers Division Workshop, SILICON-CONTAINING POLYMERS AND COMPOSITES, OMNI HOTEL, SAN DIEGO, CALIFORNIA USA\* DECEMBER 16 -19, 2018
- Hydrosilylation was performed in a scintillation vial, with medium stirring at room temperature. The scale of the polymerization was 0.5 mmol with a 1:1 ratio of 3,5-difluoro-2,4,6-tris(pent-4-en-1-yloxy)pyridine and the H21 siloxane pre-polymer (4000-5000 g/mol). The hydrosilylation proceeded rapidly within 10 s. Upon completion, the elastomer was cured at 200 °C under vacuum for 48 h affording nearly quantitative mass recovery. The cured elastomer was purified via Soxhlet extraction with refluxing toluene for 24 h, affording a final mass recovery of 84%. Both pre- and post-Soxhlet elastomers were characterized by thermal analysis utilizing TGA and DSC.

### Collaborative research with undergraduates: Research project and research design

- **Schoffstall, Allen**
- Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), YCC-2.
- For new faculty, involving undergraduates in collaborative research projects is both rewarding and challenging. For the most satisfying and productive experience, the scope, feasibility, and nature of the project must be carefully chosen. The composition and structure of a research group can also be powerful factors in dictating an investigation's success. Several recommendations will be shared from the experiences of faculty members who have successfully developed research programs involving undergraduates in research of high scientific merit and productivity.

### Sonogashira coupling reactions with bromomethyl quinoxaline derivatives

- By McGrath, Andrew; Stewart, Kevin; **Schoffstall, Allen**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1454.
- Methylbromoquinoxaline derivs. were prepd. from the corresponding methylquinoxalines and allowed to react with terminal alkynes under Sonogashira reaction conditions with trimethylsilylacetylene, yielding a fully hydrogenated Me group rather than the terminal alkyne quinoxaline product, and a halogenated alkyne product. The scope of this reaction will be explored.

#### Triazole derivatives from 2-bromomethyl-3-phenylpyrazine

- By Swanson, Louis; **Schoffstall, Allen**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1434.
- Bromination of 2-methyl-3-phenylpyrazine afforded 2-bromomethyl-3-phenylpyrazine in good yield. The product was treated under two different sets of reaction conditions with terminal alkynes to yield 1H-1,2,3-triazole derivs. Typically the desired products were obtained in acceptable yield along with minor side products. Purifn. was accomplished using flash chromatog. Purified products were characterized using NMR spectroscopy and FTIR spectroscopy.

#### Synthesis of isoxazoles via copper(I) catalysis with N-chlorosuccinimide

- By Morris, William; **Schoffstall, Allen**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1447.
- Isoxazole derivs. were prepd. by Cu(I)-catalyzed cycloaddn. of org. nitrile oxides and alkynes in one-pot syntheses. The nitrile oxide intermediates were formed from aryl aldoximes with N-chlorosuccinimide at low heat with light. Reactions were carried out as one-pot syntheses where all reagents were left to react to form products in a single step. Crude products were extd. with Et acetate and submitted to flash column chromatog. for purifn., giving the final products, which were characterized using NMR and IR spectroscopy.

#### Change is inevitable: A perspective on the evolving instruction of first year organic chemistry

- By Druelinger, Melvin; **Schoffstall, Allen**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-215.
- The content of first year org. chem. courses derives from available textbooks of the time. Student learning in org. chem. ranges from rote memorization of reactions and assocd. data to solving complex problems using higher order thinking. It is clear that students have more to learn now than in former years and that instructor expectations of students have increased to include solving multistep syntheses, combined spectral and predictive mechanistic problems. What was once a trip through some basic org. reactions and processes for students has been transformed into learning expectations of a web of theory and mechanism, along with synthesis, problem solving and learning of bioorg. chem. The students have ever more learning aids available and a changing landscape of learning goals in their org. courses. Current emphasis is more on the how and why of org. chem. than merely on what happens. Some future directions will be addressed.

#### Synthesis and isolation of functionalized quinoxalyltriazoles

- By Clements, Christopher M.; **Schoffstall, Allen M.**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1452.

- Reaction of an isomeric mixt. of bromonitroquinoxalines with sodium azide was used to synthesize the mixed azido derivs. used to react with a terminal alkyne to produce nitroquinoxalyl-1H-1,2,3-triazoles. The nitro group was reduced to a primary amine via hydrogenation with a palladium on carbon catalyst. With the core of the mol. synthesized, isomeric sepn. was undertaken as well as the addn. of various substituents. All products were solids and gave moderate yields. Purifications were carried out at different stages using chromatog. methods. All purified products were characterized using  $^1\text{H}$  NMR spectroscopy, FTIR spectroscopy, and m.p.

#### Triazole synthesis and microwave-assisted Diels-Alder cycloaddition

- By Montanez, Jose L.; **Schoffstall, Allen M.**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1450.
- Presenting possible anti-fungal, anti-bacterial, anti-viral, anti-tumor, anti-convulsant activity and acting as a bioisostere and a peptidomimetic, a 1H-1,2,3 triazole was synthesized through a "one pot" method using "click chem." affording yields of 53-57%. The triazole was reacted with dimethylacetylene dicarboxylate under microwave conditions to undergo Diels-Alder cycloaddn. The Diels-Alder adduct was characterized through  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR spectroscopy and LCMS to confirm the structure of the adduct.

#### Synthesis of perfluoropyridyl-1H-1,2,3-triazole derivatives

- By Trujillo, Marissa N.; **Schoffstall, Allen M.**
- From Abstracts of Papers, 255th ACS National Meeting & Exposition, New Orleans, LA, United States, March 18-22, 2018 (2018), CHED-1441.
- Reaction of tetrafluoropyridyl azide with terminal alkynes under Sharpless/Meldal conditions (click chem.) afforded triazole derivs. contg. the 2,3,5,6-tetrafluoropyridine moiety. The triazole derivs. were isolated and purified using flash chromatog. The purified triazoles were given nucleophilic substitution to produce brominated triazoles, which were also purified using flash chromatog. These compds. were propargylated via Williamson ether synthesis to produce alkynyltriazoles. All products were solids and each reaction gave good yields and recoveries. The purified products were characterized using  $^1\text{H}$  NMR and IR spectroscopy.

**External Scholarly Presentations (2007-2017)** All collaborators except Ms. Corley and Mr. Butler were undergraduates.

1. Stewart, Kevin A.; **Schoffstall, Allen M.**, Synthesis of pyridazinedione derivatives of triazole diesters, Abstracts, Rocky Mountain Regional Meeting of the American Chemical Society, Loveland, CO, United States, October 25-28 (2017), RMRM-107.
2. McGrath, Andrew T.; **Schoffstall, Allen M.**, Nitration and reduction of pyrazines, Abstracts, Rocky Mountain Regional Meeting of the American Chemical Society, Loveland, CO, United States, October 25-28 (2017), RMRM-177.
3. Gaulke, Eric; Butler, Christopher R.; Schoffstall, Allen; Lowe, Luis E.; Owens, Janel E. Quantitative analysis of tetrabromobisphenol-A and tribromobisphenol-A in dust from consumer electronics, Abstracts of Papers, 253rd ACS National Meeting & Exposition, San Francisco, CA, United States, April 2-6, **2017**, ENVR-761.

4. McGrath, Andrew T.; Schoffstall, Allen M., Synthesis and reactions of dicyanopyrazines, Abstracts of Papers, 253rd ACS National Meeting & Exposition, San Francisco, CA, United States, April 2-6, **2017**, CHED-1483.
5. Tvrdy, Kevin C.; Schoffstall, Allen; Braun-Sand, Sonja B.; Rolsma, Caleb, Outreach as an essential element of research training: Exposing REU participants to the divide in STEM-field enthusiasm, Abstracts of Papers, 253rd ACS National Meeting & Exposition, San Francisco, CA, United States, April 2-6, **2017**, CHED-283.
6. Schoffstall, Allen M.; Mayer, Brett; Butler, Christopher R.; Robertson, Sara; Stewart, Kevin A.; Shoemaker, Richard K., One-pot microwave experiments with NMR characterization of synthetic triazole esters, Abstracts of Papers, 253rd ACS National Meeting & Exposition, San Francisco, CA, United States, April 2-6, **2017**, CHED-97.
7. Corley, Cynthia; Iacono, Scott; Schoffstall, Allen, New difunctional perfluoropyridine-based cfor advanced polymer applications, Abstracts of Papers, 252nd ACS National Meeting & Exposition, Philadelphia, PA, United States, August 21-25, **2017**, POLY-380.
8. Drake, Hannah; Schoffstall, Allen; Henry, Renee M., Green metal extraction using monocarboxylic acid and dicarboxylic acid ligands, Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, **2016**, CHED-661.
9. By George, Laura; Tracey, Breanna; Duensing, Allison; Schoffstall, Allen, Comparison of synthetic methods for copper(I)-catalyzed fluorinated triazoles, Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, **2016**, CHED-1351.
10. Russell, Anna; Butler, Chris; Schoffstall, Allen; Henry, Renee, Green metal binding for a brighter future, Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, **2016**, INOR-415.
11. Butler, Christopher R.; Schoffstall, Allen M.; Shoemaker, Richard K., Unequivocal structure proof using NMR spectroscopy in a first-year organic laboratory project, Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, **2016**, CHED-21.
12. Butler, Christopher; Schoffstall, Allen, Regioselective reduction of 1H-1,2,3-triazoles diesters and triesters, Abstracts of Papers, 251st ACS National Meeting & Exposition, San Diego, CA, United States, March 13-17, **2016**, ORGN-559.
13. Braun-Sand, Sonja B.; Schoffstall, Allen M., Hosting an REU at a PUI: Benefits and challenges, Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, **2015**, PROF-24.
14. Butler, Christopher R.; Arroyave, Alejandra; McGee, Kelly; Schoffstall, Allen M., Synthesis of 1H-1,2,3-triazole esters and acids, Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, **2015**, ORGN-532.
15. Schoffstall, Allen M.; Dymek, Chester; Gaddis, Barbara A., Undergraduate chemistry assessment at UCCS, Abstracts of Papers, 248th ACS National Meeting & Exposition, San Francisco, CA, United States, August 10-14, **2014**, CHED-450.
16. Butler, Chris R.; Schoffstall, Allen M., Synthesis of arylpropionic acids and arylbromoalkenes, Abstracts of Papers, 248th ACS National Meeting & Exposition, San Francisco, CA, United States, August 10-14, **2014**, CHED-19.
17. Barnett, Erin S.; Schoffstall, Allen M., Copper-catalyzed green synthesis of bis-1,2,3-triazoles, Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, United States, March 16-20, **2014**, ORGN-200.
18. Butler, Christopher R.; Schoffstall, Allen M., Comparing conventional heating to microwave assisted organic synthesis of 1H-1,2,3-triazoles, Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, United States, March 16-20, **2014**, CHED-1050.
19. Hamill, B. D., Mendes, D. E., Schoffstall, A. M. *Microwave-assisted synthesis of triazoles by decarboxylation and click chemistry*, Development of microwave "click" syntheses of triazoles with undergraduate and graduate students. Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, **2013**, CHED-919.
20. Mayer, B., Balyeat, J., Schoffstall, A. M. *Using a PicoSpin NMR spectrometer in the sophomore organic lab*, Demonstration of the utility of a PicoSpin low-field nmr instrument in the



undergraduate laboratory. Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, **2013**, CHED-12. This included an additional invited presentation at a PicoSpin workshop at the ACS meeting sponsored by PicoSpin. (PicoSpin has been acquired by Thermo Scientific.)

21. Hamill, Brayden; Calvin, Marcus; Schoffstall, Allen M. *Synthesis of disubstituted 1,2,3-triazoles* Abstracts of Papers, 23rd Rocky Mountain Regional Meeting of the American Chemical Society (ACS), Westminster, CO, United States, October 17-20, **2012**, RMRM-277.
22. Haugberg, Ross; Asay, Christy; Schoffstall, Allen M. *Microwave-assisted Diels-Alder reaction of a 1,2,3-triazole*, Abstracts of Papers, 23rd Rocky Mountain Regional Meeting of the ACS, Westminster, CO, October 17-20 (**2012**), RMRM-278.
23. Calvin, Marcus I.; Hamill, Brayden D.; Mueller, Joann E.; Schoffstall, Allen M. *Synthesis of disubstituted 1,2,3-triazoles via copper(I)-catalyzed cycloaddition* Abstracts of Papers, 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-March 29, **2012**, CHED-1186.
24. Benner, Crystal R.; Schoffstall, A. M. *Kinetic study of the reaction of trichloroisocyanuric acid with phenylpropionic acid* Abstracts of Papers, 242nd ACS National Meeting & Exposition, Denver, CO, August 28-September 1, (**2011**), CHED-226.
25. Schoffstall, A. M.; Zimmerman, J.; Mendes, D. E.; Benner, C.; Breitmeyer, B. *NMR spectroscopy in the general chemistry laboratory* Abstracts of Papers, 242nd ACS National Meeting & Exposition, Denver, CO, August 28-September 1, (**2011**), CHED-89.
26. Nguyen, H. A.; Schoffstall, A. M. *Fluorinated 1,5-disubstitued 1,2,3-triazoles* Abstracts of Papers, 241st ACS National Meeting & Exposition, Anaheim, CA, March 27-31, **2011**, CHED-1024.
27. Robertson, W. A.; Knobbe, K. A.; Levulis, S.; Schoffstall, A. M. *Synthesis of 1,4-disubstituted triazole derivatives using click chemistry* Abstracts of Papers, 241st ACS National Meeting & Exposition, Anaheim, CA, March 27-31, **2011**, CHED-1007.
28. Schoffstall, A. M.; Ruminski, R. R.; Benner, C. R.; Mendes, D. E.; Breitmeyer, B. M. *Guided inquiry experiments with Fourier Transform NMR spectroscopy* Abstracts of Papers, 241st ACS National Meeting & Exposition, Anaheim, CA, March 27-31, **2011**, CHED-20.
29. Mendes, D.E. and Schoffstall, A. M., *Reactions of 2-alkynylcarboxylic acids and terminal alkynes*, 240<sup>th</sup> ACS Meeting, Boston MA, August **2010**, ORGN 209
30. Schoffstall, A. M., Braun-Sand, S., Henry, R. M., Weiss, D. J. and Canaria, J. A.; *Collaborative undergraduate research methods course*, 240<sup>th</sup> Natl.ACS Meeting, Boston MA, August, **2010**, CHED 69
31. Schoffstall, A., M., *Orchestrating the undergraduate research experience*, 239<sup>th</sup> National ACS Meeting, San Francisco, CA, March, **2010**, YCC Paper 12
32. Benner, C. R., Schoffstall, A. M., *Mechanism of reaction of bleach with phenylpropionic acid derivatives*, 239<sup>th</sup> National ACS Meeting, San Francisco, CA March **2010**, CHED 1181
33. Lopez, A. F.; Schoffstall, A. M., *Halogenation of phenylacetylene*, 239<sup>th</sup> National ACS Meeting, San Francisco, CA March **2010**, CHED 1173
34. Schoffstall, A. M., Gaddis, b. A., Stark, C. A., *Benefits of undergraduate research*, 239<sup>th</sup> National ACS Meeting, San Francisco, CA March **2010**, CHED 153
35. Schoffstall, A.M., *Coordinating and operating the undergraduate research experience*, 237<sup>th</sup> ACS National Meeting, Salt Lake City, March 22-26, **2009**, YCC Paper #24.
36. Schoffstall, A. M., Gaddis, B. A., Padilla, R. and Horner, S. M., *Evaluating the effects of the undergraduate research experience*, 236<sup>th</sup> ACS National Meeting, Phila., PA, August, **2008**, Paper 105, CHED division.
37. Hirsch, T. A., Schoffstall, A.M., *Decarboxylation reactions with alkyne acid derivatives*, 235<sup>th</sup> ACS National Meeting, New Orleans, LA, April, **2008**, Paper 627, CHED division.
38. Schoffstall, Allen, Gaddis, Barbara, *Undergraduate Research: Is it worth the effort?* 20th Biennial BCCE, Bloomington IN, July 30-August 3, **2008**, presented as part of an all-day symposium of the 2008 BCCE on undergraduate research co-organized by Barbara Gaddis and A. Schoffstall.

39. Anciaux, Desiree E.; Schoffstall, Allen M., Azide Cycloaddition Reactions, Abstracts, 20th Rocky Mountain Regional Meeting of the American Chemical Society, Denver, CO, United States, August 29-September 1 (**2007**), RM-050.
40. Anciaux, Desiree E.; Schoffstall, Allen M., Copper (I)-catalyzed synthesis of 1,2,3-triazoles by cycloaddition, Abstracts of Papers, 233rd ACS National Meeting, Chicago, IL, United States, March 25-29, 2007 (**2007**), CHED-546.
41. Schoffstall, Allen M.; Gaddis, Barbara A., Inquiry-based learning in the organic chemistry laboratory, Abstracts of Papers, 233rd ACS National Meeting, Chicago, IL, United States, March 25-29, 2007 (**2007**), CHED-140.

### ***Collaborators (2011-2018)***

Asirvatham, Margaret, Department of Chemistry, UC Boulder  
 Braun-Sand, Sonja, formerly of the Department of Chemistry, UCCS  
 Chan, Edward, National Jewish Hospital Research Laboratory, Denver CO  
 Druelinger, Melvin L., Department of Chemistry, Colorado State University-Pueblo  
 Gaddis, Barbara A., Science Learning Center and Recruitment/Retention, UCCS  
 Henry, Renee, Department of Chemistry, UCCS  
 Iacono, Scott, Research Professor of Chemistry, US Air Force Academy  
 Kalita, Jugal, Dept. of Electrical and Computer Engineering, UCCS  
 Kresheck, Gordon, Department of Chemistry, UCCS  
 LaBarbera, Daniel, Anschutz College of Pharmacy, CU Denver, Aurora CO  
 Owens, Janel, Department of Chemistry, UCCS  
 Padwa, A. Department of Chemistry, Emory University, Atlanta GA  
 Pinchuk, A. Department of Physics and Energy Science, UCCS  
 Ruminski, Ronald R., Department of Chemistry, UCCS  
 Staley, Constance, Department of Communication, UCCS  
 Undergraduate and Graduate UCCS Student Collaborators on Laboratory Projects  
 Weiss, David, Department of Chemistry, UCCS

### ***Grants Awarded 2008-2012***

1. **Merck Foundation grant** for interdisciplinary research, 2009-2012, \$60,000.00, Co-PI: Students rotate through the research laboratory and experience an original synthetic project.
2. **Guided Inquiry NMR Project**, NSF # [0736941](http://www.nsf.gov/awardsearch/showAward.do?awardNumber=0736941), ended in 2012, \$149,431.00, PI of the project, including development of a lab experiment for Chem. 1060 (Oil of Wintergreen) and an experiment for Chem. 3380 (epoxide project) with the assistance of B. Breitmeyer and D. Mendes. See: [http://www.uccs.edu/~chemistry/about\\_nsf\\_nmr.html](http://www.uccs.edu/~chemistry/about_nsf_nmr.html).
3. **Shimadzu Scientific Instruments, LC/MS grant**, J. Owens, PI, LC part funded for \$71,500. July, 2011. My role is was an adviser to students using the instrument.

### ***Grant Awarded (NSF) 2013-2016***

<a href="http://www.nsf.gov/awardsearch/showAward.do?awardNumber=1156932">1156932</a>	Research Experience for Undergraduates:	Awarded	09/5/2012	08/24/2011	\$300,000.00
CHE	Green Chemistry in Colorful Colorado 2013-2016	PI and Co-PI	Award date	Date submitted	

### ***Internal Grant Awarded (2018)***

Environmental PFC Impact Collaboration (EPIC) in the Fountain Creek Watershed: Determining the Environmental, Ecological, and Societal Impact of PFCs, was selected to be funded. J. Owens (PI) \$125,000 over three years (2018-2021). LAS College, UCCS.

### ***Declined Grant Proposals 2007-2018***

Ten other proposals were submitted to NSF having my name as a co-PI.

### ***Teaching Activities 2013-2018***

Chem. 3201-3211 during each year since 2014, Chem. 5401 in alternate years, Chem. 4421/5421 alternate years, Chem. 4904/5904 each semester and summers, Chem. 3101 and 3111 taught as trailer courses, fall semester and spring semester to 2014. Administer Chem 4905, Internship.

### ***Committee Service 2010-2018 (Refer to the Annual Scholarly Reports)***

College: EAS Dean's Review Committee, 2011-2012, 2014-2018.

University: Graduate Executive Committee Nelson, Klebe, 2011-2018

University: Intercollegiate Athletic Advisory Committee: 2011-2013, Chair, 2012-2013 and current, 2014-2018

University: Program Review Committee, now Committee on Undergraduate Education, 2011-2018

Department: Primary Committee Chair for Dr. Sonja Braun-Sand, other primary committees

College: College Budget Advisory Committee, now Budget and Planning, 2011-2012. 2016-2018

Department: Department Assessment coordinator, 2010-2018

Department: Chemistry Graduate Program Director 2010-2018

Department: Thesis committee chair, Ms. Mendes, 2011; Mr. Butler, 2016.

University: Mosaic Program mentor, 2010-2013. Mosaic faculty award, 2012

Search Committees, Department and College 2011-2018

### ***Serving as UG or Graduate Research Adviser 2010-2014\****

1. Albert Marle III , (armed services med school), 1,4-Triazoles, Fall, 2010
2. Amy Sylvester, Triazole synthesis using additive reductants, Summer and Fall, 2010
3. Brian Litch, Chloroalkyne synthesis (CSURF presenter), Spring 2010
4. Christina Stark, Master's, Polyene syntheses using Grignards, Spring and Fall, 2010
5. Crystal Benner (grad school), Bachelor's, Junior, TCICA reaction with propiolic acids, (National ACS Meetings presenter, San Francisco. 2010 and Denver, 2011
6. Desiree Mendes (PhD , Wash. St.), Master's, Triazole synthesis and decarboxylation of alkynoic acids using Cu catalysis (Regional and National ACS Meetings presenter, 2010 and 2011
7. Erin Barnett, Master's, Benzotriazoles, 2010-2013
8. Huy Nguyen (Pyxant Labs), Bachelor's, Senior, 1,5-Triazoles, 2010, National ACS Meeting presenter, 2011
9. Kirstin Knobbe (med school, Marquette), Bachelor's, Senior, Diubstituted and fluorinated triazoles, 2010-2011, National ACS Meeting presenter, 2011
10. Roberto Padilla (PhD program at VPI), Bachelor's, Junior, Isoxazoline synthesis, Spring and summer 2010
11. Seth Levulis, Triazole preparations Spring 2010
12. Susan Wilds, Master's, withdrew, Triazole synthesis Summer and Fall, 2010
13. Wes Robertson (public health grad school), unclassified Graduate, Triazoles with fluorine substituents, 2010-2011, National ACS Meeting presenter, 2011
14. Joann Mueller (CU med school), Merck scholar, Hydroxylated triazoles via decarboxylation, 2011-2012, National ACS Meeting presenter, 2012
15. Marcus Calvin, Merck scholar, Triazoles via decarboxylation, 2011-2012, National ACS Meeting presenter, 2012

16. Brayden Hamill, Merck scholar, (pharmacy school, Anschutz) Triazole synthesis, 2011-2012, National ACS Meeting presenter, 2012
17. Stephanie Kirchoff, triazole synthesis, 2011
18. Wynne Reis (Pyxant Labs), Triazole synthesis, 2011
19. Chris Butler, Triazoles, 2012-2013
20. Christy Asay, Diels-Alder synthesis using MW, 2012, Regional ACS Meeting presenter, 2012
21. Ross Haugberg, Diels-Alder microwave reaction, 2012, Regional ACS Meeting presenter, 2012
22. Thomas McKeon, Fluorinated triazoles, 2013
23. Nate Sundquist, Alcoholic triazoles, 2013
24. Michael Skolba, Triazoles, 2013
25. Boone Evans, Triazoles, REU participant, 2013
26. Austin Henke, Triazoles, REU participant, 2013

\*Note: Most UG students listed above also gave CSURF posters at least once.

### ***Serving as Research Adviser 2014-2018***

Please refer to the Presentations at Conferences cited above.