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Department of Chemistry and Fermentation Sciences

THE PERIODIC TIMES

STUDENT NEWSLETTER - DEC 2024

CHEMISTRY AND FERMENTATION SCIENCES NEWSLETTER

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WELCOME!

BY EDITOR-IN-CHIEF ERIN CHETTY

Welcome to the December 2024 edition of the Periodic Times, a newsletter curated by some of our own chemistry and fermentation science students! This edition focuses on all things finals and mental health along with the regular sections you all know and love like student, faculty, and alumni news. As the semester comes to an end, finals are fast approaching and we have included some tips from a senior that has endured his fair share of last-minute cramming. We also spoke with recent graduate, Elizabeth Haslam, about her experience with applying to graduate school since deadlines are fast approaching. Make sure to check out the career development center where there are resources to help with graduate school applications. We also checked in with a student researcher, Masa Al Horani, who attended the Sermacs 2024 conference this past month. She presented her research to a room full of chemists and is excited to share her experience with all our readers! Relax with us at the end of this edition with a chemical reaction matching game, unless it brings up memories from organic chemistry, in which case you may want to flip back to our mental health advice page or try out Dr. Taubman's homemade kombucha recipe.

JOBS & INTERNSHIPS

BY ERIN CHETTY

Interested in a summer internship?

If you're looking for a fun way to fill your summer while also gaining experience check out these summer internships!

SUROC—Summer Undergraduate Research Opportunity in Chemistry
University of North Carolina, Chapel Hill
https://suroc.web.unc.edu/
Topics: Analytical, Biological, Inorganic, Organic, Physical, or Polymer/Materials
Deadline to apply: 2025 application not live

NASA Summer Internship Program
NASA | Langley, Virginia
https://stemgateway.nasa.gov/public/s/explore-opportunities
Topics: Geoscience, Chemical Engineering, Computational Chemistry, Materials, Biochemistry, Biosciences, Physical Sciences
Deadline to apply : February 28 2025 (Summer 2025); May 16, 2025 (Fall 2025)

LSRM (Laboratory for Research on the Structure of Matter) Summer REU
University of Pennsylvania | Philadelphia, Virginia
https://www.lrsm.upenn.edu/outreach/reu/
Topics: Organic Chemistry, Materials, Biochemistry, Chemical Engineering, Biosciences, Inorganic Chemistry, Physical Sciences
Deadline to apply: February 1, 2025

Job Opportunities

If you're graduating soon, consider using these sources to find a job:

Fermentation Sciences Board

Laboratory Jobs

Ihirechemists

For more internship opportunities visit this ACS website:
https://www.acs.org/education/students/college/experienceopp.html

PROFESSIONAL DEVELOPMENT CORNER

BY STEPHANIE HERNANDEZ

Are you in the midst of applying for graduate school and don't know what comes next? Take a trip to the career development center Monday-Thursday from 2-6 pm or the writing center Monday-Thursday from 9 am- 9 pm & Friday from 9 am - 12 pm.

Graduate School Interviews

The career development center offers mock interviews to help prepare for graduate school interviews. Whether it's calming nerves, or honing in on the perfect response to where you see yourself in 5 years, the career development center is here to help! If you are short on free time, don't worry! The career development center provides free access to Big Interview. This resource allows students to register and practice their interview skills from the comfort of their own home. Hopefully through utilizing these resources students will be able to feel more comfortable and confident when the time comes to have their interviews.

Headshots

In need of a headshot for your LinkedIn profile, or before you graduate? The career development center offers free headshots for all students, with access to their free closet filled with professional clothing. This can be very advantageous, because out in the real world a professional headshot can cost upwards of $100!

Personal Statements

When it comes to graduate school, personal statements can make all the difference. They provide insight to who you are as a person as well as whether you would be the right fit at their institution. If you feel lost and don't know where to start, or if you need someone to proofread your paper for any grammatical errors, make an appointment at the writing center! There someone will give you feedback on the structure of your statement, and help with any questions you may have about strengthening or structuring the statement. It's always important to have a second pair of eyes to read over anything you may write to catch anything you missed!

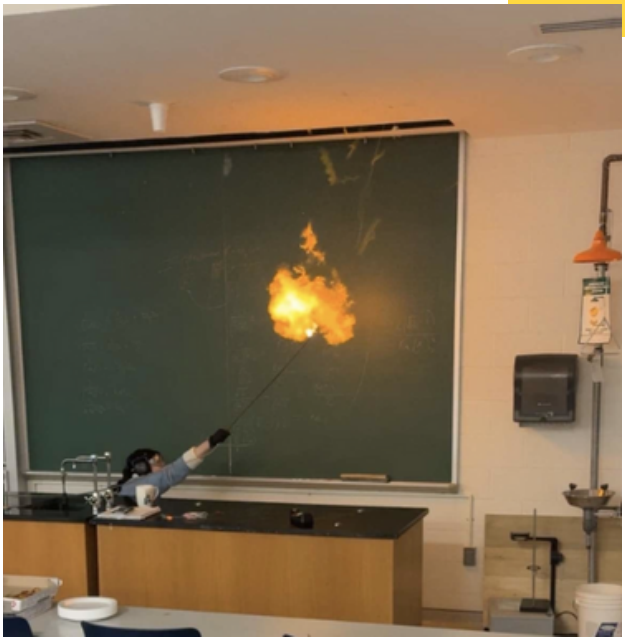
To explore their website, use the following link!

https://careers.appstate.edu/

CLUB NEWS

BY SETH BRAHNEY

The Appalachian Chemical Society has continued meetings, post hurricane Helene. Unfortunately, due to the storm, the demo show ended up on the chopping block. However, many of their meetings have included demos that would've been featured in the show. For example, the woosher bottle where you add ethanol to various sizes of bottles, let it evaporate, and light the opening to the bottle, allowing it to rocket off was a popular event. The spitting of fire by the clubs very own president Luke Darney was also featured recently. Speaking of elected officials recently the club hosted its election for the spring 2025 fall 2025 officers. Congratulations to Seleen Al Horani (President) and Masa Al Horani (Vice President), I certainly look forward to attending meetings my last semester and seeing what direction the club goes in. To the officers recently relieved of duty, thank you for your dedication and service and inspiring the next generation of Appalachian chemists.



STUDENT NEWS

BY DYLAN GOLIBER

Chemistry conferences have wrapped up, concluding a time of presentations, networking, and collaboration. These opportunity-filled conferences have been attended by many students from App State, with Masa Al Horani being a great example. She is a Chemistry major with a concentration in Certified Chemistry who has been working in Dr. Petia Bobadova's research group for two years. During this time, she has given numerous poster presentations, delivered an oral presentation, and co-authored a published paper titled "Synthesis and Regioselective Functionalization of Tetrafluorobenzo-[α]-Fused BOPYPY Dyes."

Along with a group of chemists from App State, Masa traveled to the SERMACS 2024 conference in Atlanta, GA, where she gave an oral presentation alongside her sister Seleen, showcasing her most recent work with Dr. Bobadova. Reflecting on the moment before her presentation, Masa says she was "a little nervous, but it's a very nice environment that gives you confidence." To those planning a presentation at a conference, she advises that preparation should start at least a month in advance if not more. She also offers this advice: "Don't be too nervous because you're the expert on your research."

FACULTY SPOTLIGHT

BY KALI RAMSEUR & RACHEL WESTBROOK

Dr. Brett Taubman

Director of Fermentation Sciences,
Professor,
Research Mentor

Q: Tell us about yourself and how you got to where you are today.

A: I'm Brett Taubman... I'm a professor in the departments and I'm the director of the Fermentation Sciences Program. Originally, I have a Bachelor of Science degree in Finance from Penn State. After that, I did a year of law school at George Washington University, met my wife there, dropped out, traveled for a while, returned to school, got a BS in chemistry at Montana State, and then went on [to get] a PhD at Maryland. I got my PhD in analytical chemistry with an emphasis on environmental work, did a post-doc at Penn State, and then came to Appalachian State University. I always had the intention of implementing at least brewing science here as a means of communicating chemistry to undergrads. New faculty was brought in, and he and I developed what would become the Fermentation Sciences Program that was approved in 2012 at the state level and merged with the chemistry department in 2018.

Q: What made you decide to choose chemistry?

A: I took chemistry and realized that it was my cup of tea because it was quantitative...there's a problem and there's a solution that you can figure out, so I really liked that part of it. You learn how the world works and why things are the way they are and that was just really cool to me and very eye-opening. I fell in love with chemistry in general and went from there.

Q: So on November 9th, you're giving a speech at Grandfather Mountain. How do you design speeches to give to the general public talking about something complex such as Fermentation?

A: It's definitely a knack and something that takes a while to learn how to do. It's also a matter of understanding the material well enough to be able to communicate it. We can be in class and we can be very erudite speaking in very technical language about what we know very well but until you can communicate that to any person and make it understandable, it's difficult to communicate with the everyday person. I try to make them fun and interesting and incorporate a lot of history about the subject as well as things that people are more interested in. I'm actually publishing a book this spring through UNC Press on fermentations specifically centered on Southern culinary culture... that's my plan for the latter part of my career...focusing more on book writing.

Q: So you're writing a book? What would be your idea for the next book that you intend to write?

A: So [the first] one is just kind of an intro into fermentation sciences because there isn't really a textbook for like foundational fermentation science. Then, there is [an idea] specifically on meat fermentations because I have a friend who has worked in high-end charcuterie and [he's] an excellent butcher. We kind of team up and teach the fermented meats and cheese course....He's an excellent butcher and has processed many animals. So he would kind of handle that portion of the course while I would handle the fermentation and science portion of the course. Another book that I'm kind of most excited about and interested in that I want to do next is specific to fungus. Things like yeasts, filamentous fungi or molds, as well as mushrooms because they have so many applications to food and fermentation.

Dr. Taubman also taught us the steps of making kombucha from home! You can find the recipe on page 10.

ALUMNI SPOTLIGHT

BY STEPHANIE HERNANDEZ

ELIZABETH HASLAM

Graduation: Spring 2023
Degree: BS in Chemistry, Individual Design

What are you currently doing?

I am currently attending the UNC Eshelman School of Pharmacy where I take many pharmacy related classes such as pathophysiology, as well as intern at the UNC Health Pediatric Pharmacy. I also do research in which we are currently looking at viremia and rejection outcomes in pediatric kidney transplant patients through pharmacokinetics and patient outcomes to determine which dose of mycophenolate mofetil (immunosuppressant) to administer so lower rates of rejection occur.

What was your most important takeaway from undergrad?

Professors that cared about us and took the time to make one on one connections. I still talk with many of the professors I formed connections with that had a profound impact on me! I also gained many skills that have followed me to graduate school such as how to read literature and time management.

What advice do you have for anyone pursuing a degree in chemistry or applying to graduate school?

Enjoy the time that you have! Don't rush moving forward because you'll miss the small things like going to football games with friends. I know it gets hard, especially during your senior year but make sure not to give up and follow your passions! If you are applying to graduate school, find the school that speaks to you! It's okay to not know what you want to do but take it one day at a time because you'll end up where you're meant to be.

How do you make time for yourself while staying so busy?

Making sure I take time for myself is really important to me! I always make sure to spend time in nature, even if it's taking a short walk. It's important to make time for yourself so you don't get burnt out!

DEAR LABBY

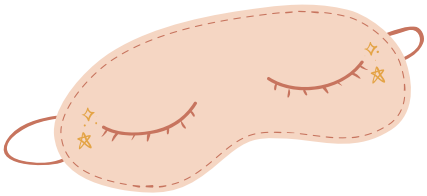
Are you in need of advice or an answer to your chemistry questions? Dear Labby provides a space for you to anonymously ask whatever you may need, and allows current students to answer to the best of their ability!

https://docs.google.com/forms/d/e/1FAIpQLSfa526nmn6y8EQe7I6cSPl_fe9_QY7LVefWs7EPiUWXkoWWDA/viewform

CONTRIBUTORS

Editor in Chief: Erin Chetty
Layout/Formatting Editors: Stephanie Hernandez & Kali Ramseur
Contributors: Seth Brahney, Rachel Westbrook & Dylan Goliber

Mental Health and Study Tips



BY SETH BRAHNEY

We have all been there. It may have been a busy week and you have been loaded with assignments. Maybe it is midterm or finals season and you prioritized other exams over another. Perhaps you are just a procrastinator and you have just put off studying cause you are being a little lazy. We have all had to cram for an exam. Here is yet another anecdote on why you should not do it and some study tips for future reference.

Back in the year of our Lord, February 2023 I was taking Organic Chemistry II with our very own Dr. Nicholas Shaw. Exam II was fast approaching and for one reason or another I put off studying for it. Part of it was I had very little to do the day before the exam and just said to myself " Oh I'll just use the freedom of Wednesday to catch up". The daylight of February 8 came and went and it was then night and I still had not started. Eventually, around 8 P.M. I headed to the library armed with my study materials, two Extra Strength Five Hour Energies, and a prayer. At about 8:30 I cracked the first energy drink and got to work feverishly memorizing the way IR and NMR spectra were produced. After a couple hours, I was losing some steam and decided to crack open the second Five Hour Energy. Big mistake. Within five minutes of consuming the second drink, I was on the floor feeling like my heart was going to pound right out of my chest. I am not a regular coffee or tea drinker so caffeine has a particularly potent effect and that was the night I really found out. After a long walk around the library, I got back to work but was only really able to half focus on my studies because my mind was still racing. I ended up leaving the library the next morning at 8 A.M. and went back to my dorm for some breakfast and a change of scenery. Eventually at 11, it was time to take the exam and I was still feeling the effects of the drinks as to say I was fidgeting would be an understatement. Taking the exam was a bit of a blur but again I could only really half focus but the exam went fine. After the exam I still had lab at 2 and even another class at 5 but I was beginning to crash. For one reason or another, I had to push through and I ended up going to bed around 1 A.M. the next morning. I ended up getting a B on the exam which is fine but was it really worth the strain I had put on myself in the prior 16 hours?

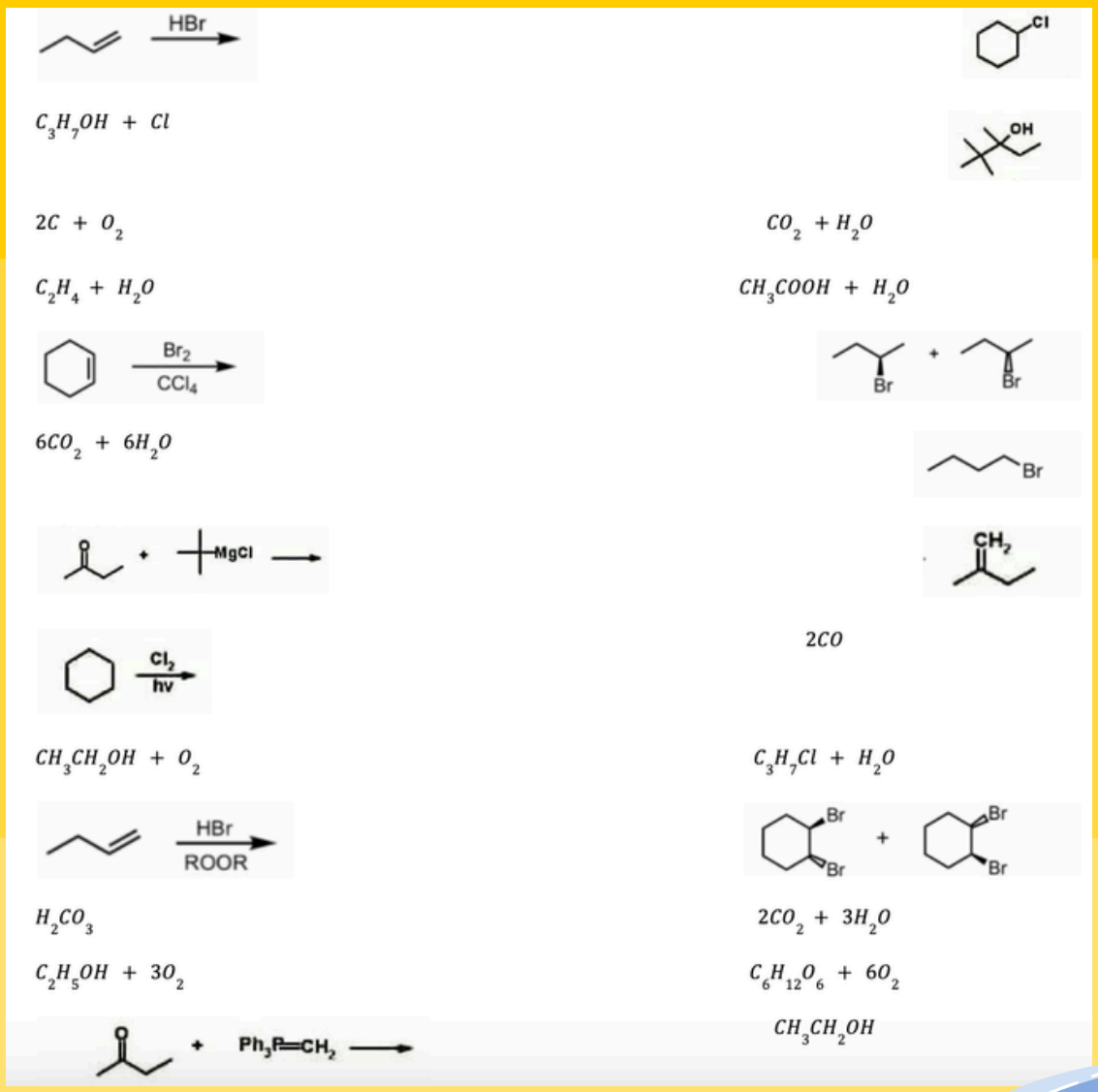
In the years since I would love to say that this was the last time I had ever put off something like this but that wouldn't really be the full truth. I have been better about spreading out my studying and my work but it's still not perfect. One of the strategies I have adopted to help be more productive is adopting the Pomodoro Method. Essentially, what this method boils down to is to eliminate all distractions and focus for 25 minutes and then take a 5 minute break. I will go through this cycle 4-5 times and then take a longer 15 minute break to get up, stretch, eat a snack, text a friend, etc. Something that has been really useful in this technique is the app Flora. It is an app where you can set your work and break times and it will lock you out of your other apps. When the timer for work starts it plants a virtual tree and if you break your focus your tree will die but if you make it through it will add your tree to your garden. It is really rewarding to see your garden grow and there is a sense of accomplishment and productivity with the app beyond just an abstract concept like a grade.

I hope my story and recommendation are entertaining as well as serve yet another example of why you really shouldn't cram.

REACTION MATCHUP!

BY ERIN CHETTY

Feeling up for a challenge? Try to match these reactions to their products! The answer key can be found on page 11! Good luck, chemists!



Kombucha Recipe

BY KALI RAMSEUR AND RACHEL WESTBROOK

Low on funds for holiday gifts? Try this cool DIY kombucha recipe Dr. Taubman crafted! Really simple and very healthy!

Ingredients:

1) Sweet Tea

2) SCOBY's (symbiotic culture of bacteria in yeast) Extracellular polysaccharides, specifically the acetic acid bacteria in the mixed culture fermentation, excrete and produce a raft-like substance that they can float on because acetic acid bacteria obligate aerobes (which need oxygen to metabolize) that have access to oxygen while fermenting the solution below.

Yeast and bacteria are located in there...Yeast ferment the sugar into alcohol, and then the acetic acid bacteria oxidizes the acetic acid for the vinegar quality. This process takes anywhere between 5 days to a couple weeks at max. The final product is very healthy!!

REACTION MATCHUP KEY!

BY ERIN CHETTY

$C_2H_5OH + 3O_2$	$2CO_2 + 3H_2O$
$6CO_2 + 6H_2O$	$C_6H_{12}O_6 + 6O_2$
H_2CO_3	$CO_2 + H_2O$
$CH_3CH_2OH + O_2$	$CH_3COOH + H_2O$
$C_2H_4 + H_2O$	CH_3CH_2OH
$2C + O_2$	$2CO$
$C_3H_7OH + Cl$	$C_3H_7Cl + H_2O$