The Crucible

Pittsburgh Section of the American Chemical Society
Volume CX, No. 5
December 2023

Contents

Get to Know A Member – Haitao Liu, Ph.D.

1. **What is your work and ACS (if applicable) title?**

   ACS: Councilor of ACS Pittsburgh Local Section
   Work: Chair and Professor, Department of Chemistry, University of Pittsburgh

2. **How many years have you been in the ACS?**

   13

3. **What is the biggest benefit of ACS Membership?**

   Meeting a lot of fantastic people outside my immediate work circle!

4. **What did you want to be when you were a child?**

   I wanted to be a scientist, for real!!

5. **What made you fall in love with Chemistry?**

   I was a very curious kid. My mom had some chemistry books from work. I read them because there was nothing else to read. Chemistry was fascinating to me because I realized that you can used chemistry to create new and transform materials.

6. **What is your favorite part of your career or job?**

   As a university professor, you are surrounded by young students who are eager to learn. You have the rare opportunity to shape their professional growth.

Do you want to be our featured member? Please email hljuzwa@shimadzu.com to get onto the schedule!

7. What is your favorite book and why?

"But How Do It Know? - The Basic Principles of Computers for Everyone"- I have a computer science BS degree (in addition to Chemistry BS) but I never truly understood how computer works at the gate/transistor level. I bought this book for my son and end up reading it through myself. I finally understood how computer works and how it is built from transistors.

Hello ACS Pittsburgh!

Please remember that our last meeting of 2023 is on Tuesday! Please plan to arrive by 5:30 pm for a short/light meeting, a meal in the campus dining hall, followed by Dr. Jeffries-EL presentation at 7 pm.

The meeting and light meal will be in the Benedum Dining Hall on the campus of Waynesburg University, conveniently located next door to where Dr. Jeffries-El will present, the Goodwin Performing Arts Center (GPAC). When you arrive at the dining hall, ask for the "Glass Dining Room".

And for those who are unable to attend the presentation in person, I believe a recording will be made for later viewing!

hope to see many of you on Tuesday!

EZ

Malika Jeffries-EL received BA degrees in Chemistry and Africana Studies at Wellesley College and M. Phil and Ph.D. in chemistry from The George Washington University. She worked as a post-doctoral researcher under the direction of Professor Richard D. McCullough at Carnegie Mellon University. In 2005, she joined the faculty in the Chemistry Department at Iowa State University and was promoted to associate professor with tenure in 2012. She was a Martin Luther King Jr. Visiting Professor in the Massachusetts Institute of Technology chemistry department in 2015. She joined the Department of Chemistry and Division of Materials Science at Boston University in 2016 and was promoted to Professor in 2022. Since July 2020 she has served as the Associate Dean of the Graduate School in Arts and Sciences.

Dr. Jeffries-EL's research focuses on developing organic semiconductors–materials that combine the processing properties of polymers with the electronic properties of semiconductors. She has authored over 40 publications and has given over 180 lectures domestically and abroad. She is an ACS Fellow (2018), and a fellow of the Royal Society of Chemistry (RSC) (2021). She has won numerous awards including the Percy Julian Award from the National Organization of Black Chemists and Chemical Engineers (NOBCChE) (2021), ACS Stanley C. Israel Regional Award for Advancing Diversity in the Chemical Sciences (2015), the Iota Sigma Pi Agnes Fay Morgan Award (2013), the ACS-Women Chemist Committee Rising Star award (2012), the Lloyd Ferguson Award (NOBCChE) (2009) and 3M Non-Tenured Faculty Award (2008). She is an Associate Editor for the RSC flagship journal, Chemical Science. She has also served on the editorial advisory boards for ACS Central Science, Macromolecules, and Chemical and Engineering News. Professor EL is also a staunch advocate for diversity and a dedicated volunteer who has served in several activities within the American Chemical Society, including the advisory board for the Women Chemist of Color Initiative and the Women Chemist Committee. She also serves the community through her work with Alpha Kappa Alpha Sorority, Incorporated (AKA). Dr. Jeffries-EL is a native of Brooklyn, New York.

My STEM Journey, From the Hood to the Hood.

Dr. Malika Jeffries-EL
Department of Chemistry and Division of Materials Science, Boston University
E-mail: malikaj@bu.edu

Abstract

Although African Americans make up approximately 13% of the US population, they are severely underrepresented in advanced degrees awarded in STEM disciplines and within the ranks of the faculty at research institutions. Despite the overwhelming statistics, Dr. Jeffries-EL pursued and completed a doctorate in chemistry, obtained an academic job, and then tenure in promotion in due course. She was born in Brooklyn, NY where she lived in public housing and attended public school. Although her situation was less than ideal, she always had a passion for science that her parents encouraged her to pursue. In this talk, Dr. Jeffries-EL will discuss what excites her about science, diversity, equity, and inclusion issues woven within her personal experiences.

As I write this note for the Crucible, I am somewhat surprised that 2023 and my year of service are coming to a close! I have learned a great deal about ACS, ACS Pittsburgh, and our community in 2023. The year has been so much fun mostly due to all the wonderful people I have met and worked with through ACS Pittsburgh. The year has been amazing, as we hosted two award dinners at the Grand Concourse, hosted live meetings at Jadens in Monroeville (kickoff), at Levity Brewing in Indiana, at the University of Pittsburgh, at the Mount Lebanon Public Library, and at Waynesburg University (On the Road). Once again, ACS Pittsburgh was active participating at the Carnegie Science Center for National Chemistry Week, sponsoring a Project SEED student, supporting the WCC events, and so much more. All because excellent volunteers are willing to take the time to commit to our community (locally, regionally, & globally). Thank you to the ACS Pittsburgh Executive Committee and to our volunteers who have made an impact!

Yet there is so much more to do – and I ask you to consider becoming even more involved. Our new Chair Alysia Mandato and Chair-elect Sam Leung are excellent leaders (they have done so much for me this year!) but I know they could use your help to have even more impact!

It doesn't have to be a time sink but every little bit helps. Maybe you could become involved with Project SEED to encourage high school students from diverse identities and socioeconomic backgrounds to engage in the chemical sciences.

Maybe it is to volunteer at the Carnegie Science Center during National Chemistry Week. Maybe it is to attend the virtual ACS Pittsburgh Environmental lectures (Thank you Ronghong!).

Of course, I hope you will get more involved, even becoming an officer! My service to the Pittsburgh section has been personally rewarding and I hope to work with you in the future as we need active members to keep ACS Pittsburgh moving forward.

Thank You, Edward P. Zovinka

Lunch and Learn

- **Are You Ready to Elevate Your Chemistry Career?**
- **Join Our Exclusive Lunch Sessions with Pittsburgh Award Recipients**

Are you a junior chemist seeking to kickstart your career? Or a mid-career chemist looking for a fresh direction? Don't miss this opportunity to meet a Pittsburgh Award recipient over a complimentary lunch and gain priceless insights!

- **What to Expect:**
  - Enjoy a FREE work lunch.
  - Engage with a Pittsburgh Award recipient and connect with 1-2 peers who share your passion.
  - Receive valuable guidance for success in both industry and academia.

- **To Schedule Your Lunch:** Contact Dr. Haitao Liu at hliu@pitt.edu with a brief self-introduction and name(s) of the adviser you'd like to meet.
- **Availability:** Now - end of 2023. Space is limited – first come, first served.

Meet Our Esteemed Advisers:

Dennis Simpson
- Experience: A distinguished 42-year career at PPG
- Achievements: Named inventor on 41 U.S. patents
- Influence: Advised countless scientists in industry

Richard Howe
- Experience: 30 years as Associate Dean at Pitt's School of Arts and Sciences
- Achievements: Coordinated $300M+ capital projects program
- Leadership: Chair of the Society for Analytical Chemists of Pittsburgh, PITTCON president, and more

Michael Mautino
- Experience: Over 30 years with Covestro LLC (formerly Bayer MaterialScience)
- Expertise: Formulating polyurethane rigid foam insulation
- Career Path: Product Research, Marketing, and Product Line/Channel Management

Steve Little
- Position: Department Chair and Distinguished Professor, University of Pittsburgh
- Research: Drug release, biomaterials. 100+ publications, 30+ patents, 2 spin-outs
- Honors: Fellow of AAAS, the National Academy of Inventors

David Waldeck
- Position: Professor of Chemistry and Director of the Petersen Institute of NanoScience and Engineering, University of Pittsburgh
- Research: Chiral Induced Spin Selectivity, nanotechnology. 260+ publications, H-index: 71.
- Honors: Fellow of AAAS, ACS, and APS

ACS Chemistry for Life®
American Chemical Society

National Chemistry Week

National Chemistry Week 2023: The Healing Power of Chemistry

The ACS Pittsburgh Local Section celebrated National Chemistry Week by partnering with the Carnegie Science Center for a variety of events hosted throughout this very special week!

"Gene-age Dream" **STEM Adventure Scholars Program.**

On October 16, 18, and 19, the ACS Pittsburgh Local Section helped to sponsor the "Gene-age Dream STEM Adventure" which is the Carnegie Science Center's "school field trip enhancement program." Teachers from local schools will brought groups of their students to participate in a full laboratory experience that they may not get in their schools. Fourteen volunteers attended the sessions throughout the week to serve as lab assistants alongside the Carnegie Science Center professionals. Teachers from four districts brought approximately 158 high school students to participate in this event.

SciTech Days: Health and Medicine demonstrations and Career Panel at the Carnegie Science Center.

A traditional exposition-style event, schools from the Pittsburgh region and surrounding communities brought students to experience hands-on demonstrations and activities on Friday, October 20th. A total of 186 students from 7 individual schools came on-site specifically for this program in addition to 700 individual visitors who were able to engage the exhibitors present. The Pittsburgh Local Section showcased the chemistry of bandages at their demonstration table which was staffed throughout the day by ten volunteers.

We extend a heart-felt thank you to the numerous volunteers who contributed to make this event a success, particularly all exhibitors, panelists, and lab assistants. Similarly, we recognize the Carnegie Science Center, for their major role in organizing and coordinating these NCW activities.

The ACS Pittsburgh Local Section also wishes to acknowledge and thank our financial contribution partners, without whom our National Chemistry Week activities could not be possible:

The Society for Analytical Chemists of Pittsburgh
The Spectroscopy Society of Pittsburgh

Their support went directly to cover the costs of both student admission and laboratory supplies.

University of Pittsburgh ACS- Student Affiliates
Nation Chemistry Week 2023: The Healing Power of Chemistry

Event Title:	Yeast in Medicine
Date:	October 16th
Location:	1000 Bryn Mawr Road
Student Club Members:	4: Anna Welser, Alex McQuain, Piper Read, Kiu Sui Jerry Cheung
Club Faculty Members:	1: Tim Tseng
Target Audience:	Elementary and Middle School Students
Number in Audience:	20 in group one, 15 in group two

Description:

This event included a short educational session introducing yeast as single cell microorganisms capable of carrying out fascinating chemical reactions. We discussed the application of genetic engineering to yeast to that enables the biosynthesis of complex medicinally useful compounds. Yeasts carry out chemical transformations efficiently and accurately by biologically catalyzed processed. In simple language, the idea of a catalyst was introduced as something that helps reactions happen faster.

To highlight the impressive efficiency, we examined the peroxidase reaction catalyzed by the catalase enzyme in yeast. This reaction was selected because the result is visually interesting and safe, making the lesson memorable and accessible even to the young students. Students formed hypotheses about what could be observed in the conversion of hydrogen peroxide to water and oxygen gas.

The students split into small groups of 2-4, with one volunteer in each group and were provided with the procedure so that the students could carry out the experiment and test their hypotheses. The procedure, which is provided on page 3, was written with the intention of introducing students to scientific terms in a simple accessible way. Photos of the small groups conducting the experiment are shown on page 2. The event concluded with small group discussion of the results, in relation to the chemical reaction and the hypotheses.


CHOSEN1

Chemical Reaction:

$$2HOOH \xrightarrow{\text{Yeast}} 2H_2O + O_2$$

Hydrogen Peroxide → Water + Oxygen

Materials:

- 50mL Graduated Cylinder
- Two 50mL Beakers
- Safety Glasses
- Nitrile Gloves
- 3% Hydrogen Peroxide
- Dish Soap
- Food Coloring
- Active Dry Yeast
- Wooden Stir Stick
- Teaspoon
- Water

Graduated Cylinder

Beaker

Form a Hypothesis:

Since we know yeast catalyzes the chemical reaction to turn hydrogen peroxide into water and oxygen, what do you think we will observe?

Procedure:

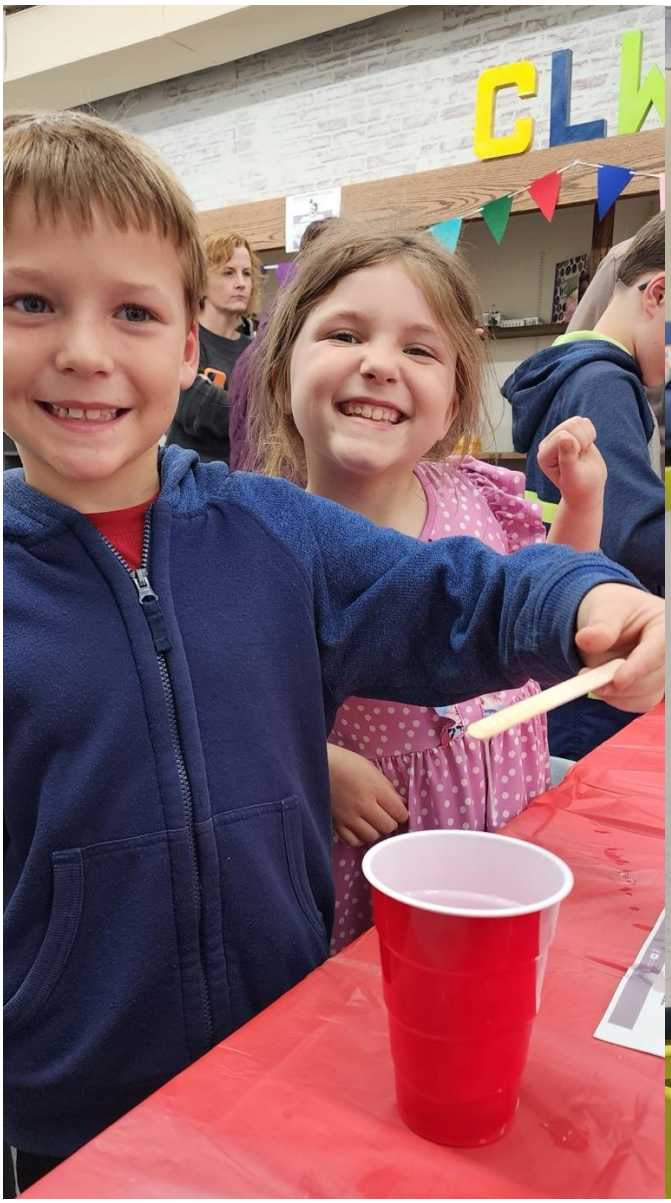
1. Collect all the materials and make sure everyone in your group is wearing **gloves** and **safety glasses.**
2. Add 1-2mL of **dish soap** to the 50mL graduated cylinder, or just enough to cover the bottom.
3. Add one teaspoon **yeast**, to the first 50mL beaker.
4. Add 10mL of **water** to the yeast in the 50mL beaker.
5. Stir the yeast and water mixture with the wooden stir stick.
6. Add the yeast and water mixture to the graduated cylinder.
7. Add 2-3 drops of **food coloring** to the graduated cylinder and use the stir stick to mix.
8. In the second beaker, measure 15mL of **3% hydrogen peroxide**.
9. Carefully add the hydrogen peroxide to the graduated cylinder.
10. Make observations! What happened? Can you conclude anything about your hypothesis?

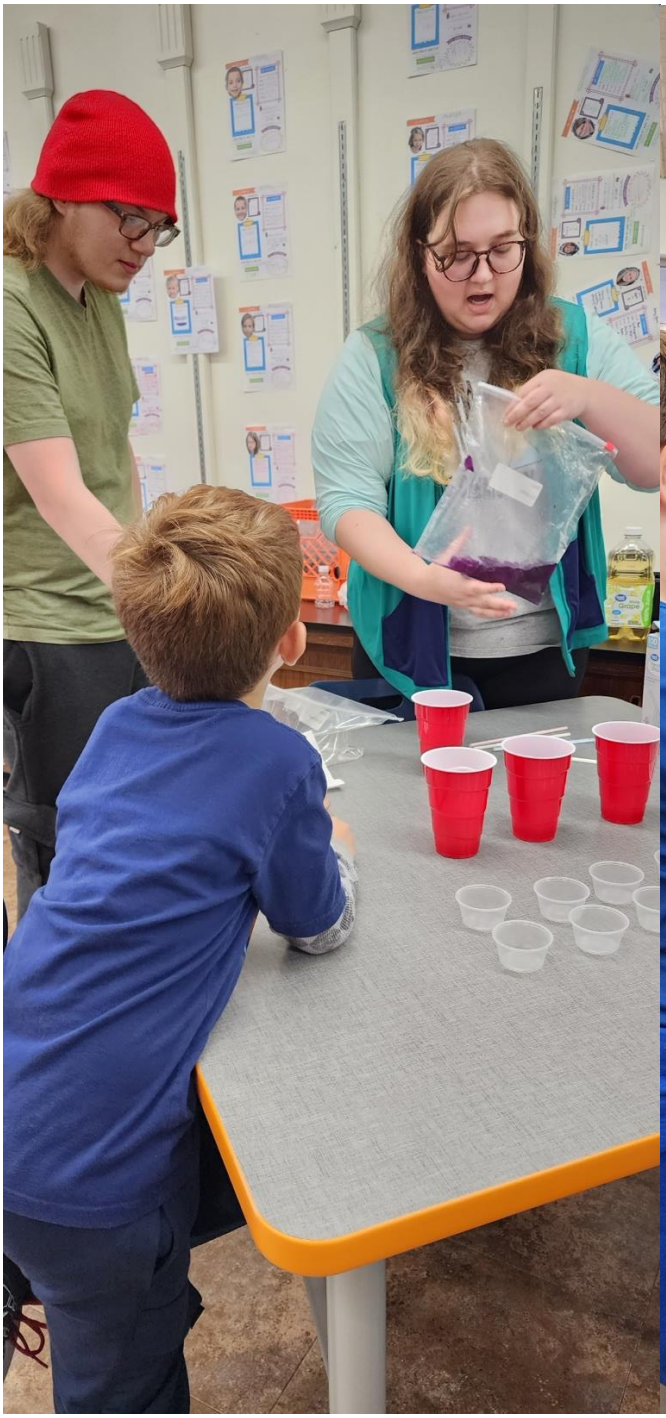
Healing Power of Chemistry PennWest Clarion ACS Chapter

10/19/2023
7 student chapter members
1 faculty advisor
3 other faculty
Public event at Clarion Learning Workshop (4-5pm) 25 elementary-aged children plus parents

The PennWest Clarion ACS Chapter participated in NCW by organizing the Healing Power of Chemistry hands-on event for the public, specifically for children in 1^{st} – 6^{th} grade. Seven chapter members and our advisor created and participated in the event. The NCW event was held at the Clarion Learning Workshop, where university faculty and students tutor children and adults of all ages every afternoon. The hands-on activities included extraction of DNA from a strawberry, pH determination using red cabbage indicator, and making lava lamps. The students described the chemistry that was occurring in each activity to the children. In total, we interacted with about 25 local children, including a girl scout troop, and their parents. The professors that run the Learning Workshop are already planning for a bigger event next year!


Great Value

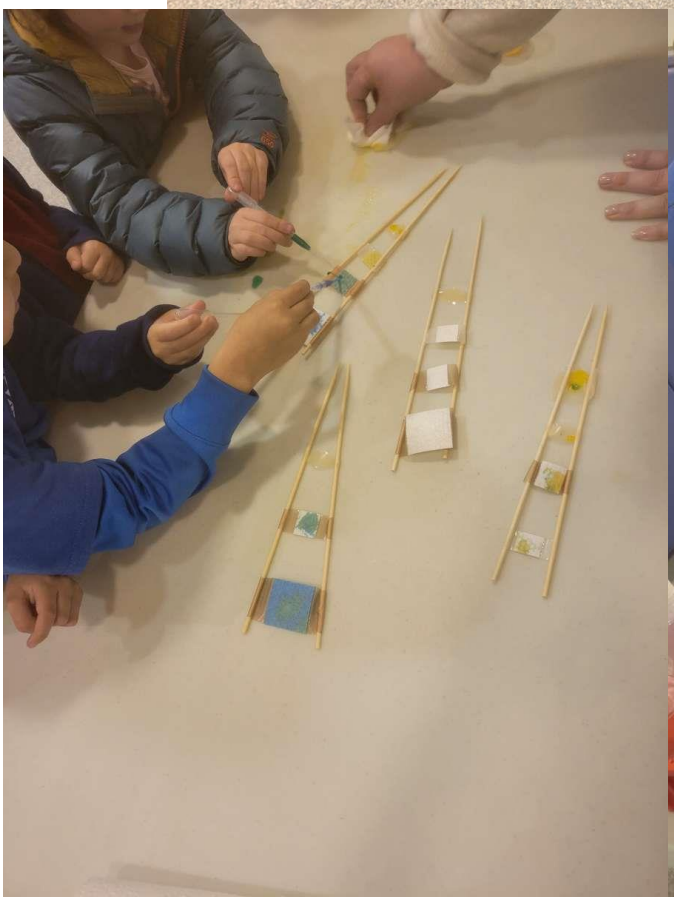




Saint Francis University Science Night Summary

SFU Chemistry Club's event, entitled Healing Powers of Chemistry, was held on Monday October 16th from 5:30-7:00 pm on Saint Francis University's campus in the Science Center. Ten club members and 2 Chemistry Department faculty members participated in hosting the event. The event, targeted for grades K-8, was attended by 27 local children and their family members. Students were divided by grade, with grades K-4 in one room and 5-8 in another. For the younger students, we highlighted the role of the environment in human health, cleaning up a simulated oil spill and demonstrating the importance of wearing sunscreen. For the older group, we led them through activities that included making their own lip balms and acid/base experiments to simulate the pH of stomach acid. Safety glasses and gloves were required for any experiment that used high temperatures or mild acids or bases.

The Pitt-Johnstown Chemical Club presented 6 hands-on activities to students in grades K-6 at the Richland Elementary School on Thursday, October 19. Students learned about the chemical reactions in hot and cold compresses, how antacids neutralize stomach acid, made their own Band-Aids, extracted DNA from strawberries, and learned which gas laws govern breathing. We had 11 Pitt-Johnstown students and 4 faculty volunteer to present activities. We had approximately 40 students at the event.



ACS Chemistry for Life®
American Chemical Society

National Chemistry Week

National Chemistry Week 2023: Illustrated Poem Contest Winners

The ACS Pittsburgh Local sections congratulates the following winners of the NCW 2023 Illustrated Poem Contest. Student artwork was evaluated based on the rules and guidelines established by the ACS National Contest. All first-place winners were submitted for judging at the national prize level. The ACS Pittsburgh Local section recognizes and thanks local teachers for encouraging their students to submit artwork.

For further information: https://www.acs.org/content/acs/en/education/outreach/ncw/plan-an-event/illustrated-poem-contest.html

Grade Category: 9-12

1st Place Winner: G.T. "Chemistry, oh Chemistry"

2nd Place Winner: P.H. "CHEMISTRY"

3rd Place Winner: L.B. "Zoopharmacognosy"

Grade Category: 6-8

1st Place Winner: A.C. "Chemistry Wound Healing"

2nd Place Winner: C.H. "The white blood cells train with the vaccines"

3rd Place Winner: M.Q. "An Ode to Skin"

Grade Category: 3-5

1st Place Winner: K.S. "Apples"

2nd Place Winner: E.H. "Zoopharmacognosy"

3rd Place Winner: J.S. "White Blood Cells"

Grade Category: K-2

1st Place Winner: C. H. "Casts Help Your Bones"

2nd Place Winner: P. L. "Bandaids"

Casts Help Your Bones

Casts help your arm feel better

By holding your bones in place

Friends can help you feel better

By drawing on your cast

Bandaids

I played on the playground.

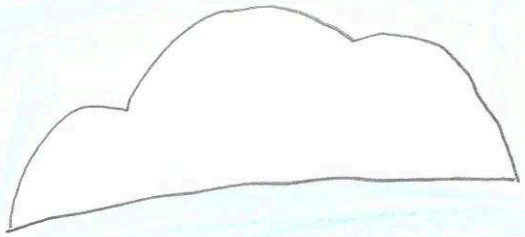
I scraped my knee.

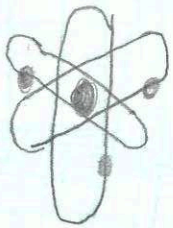
I need a bandaid to heal this thing.

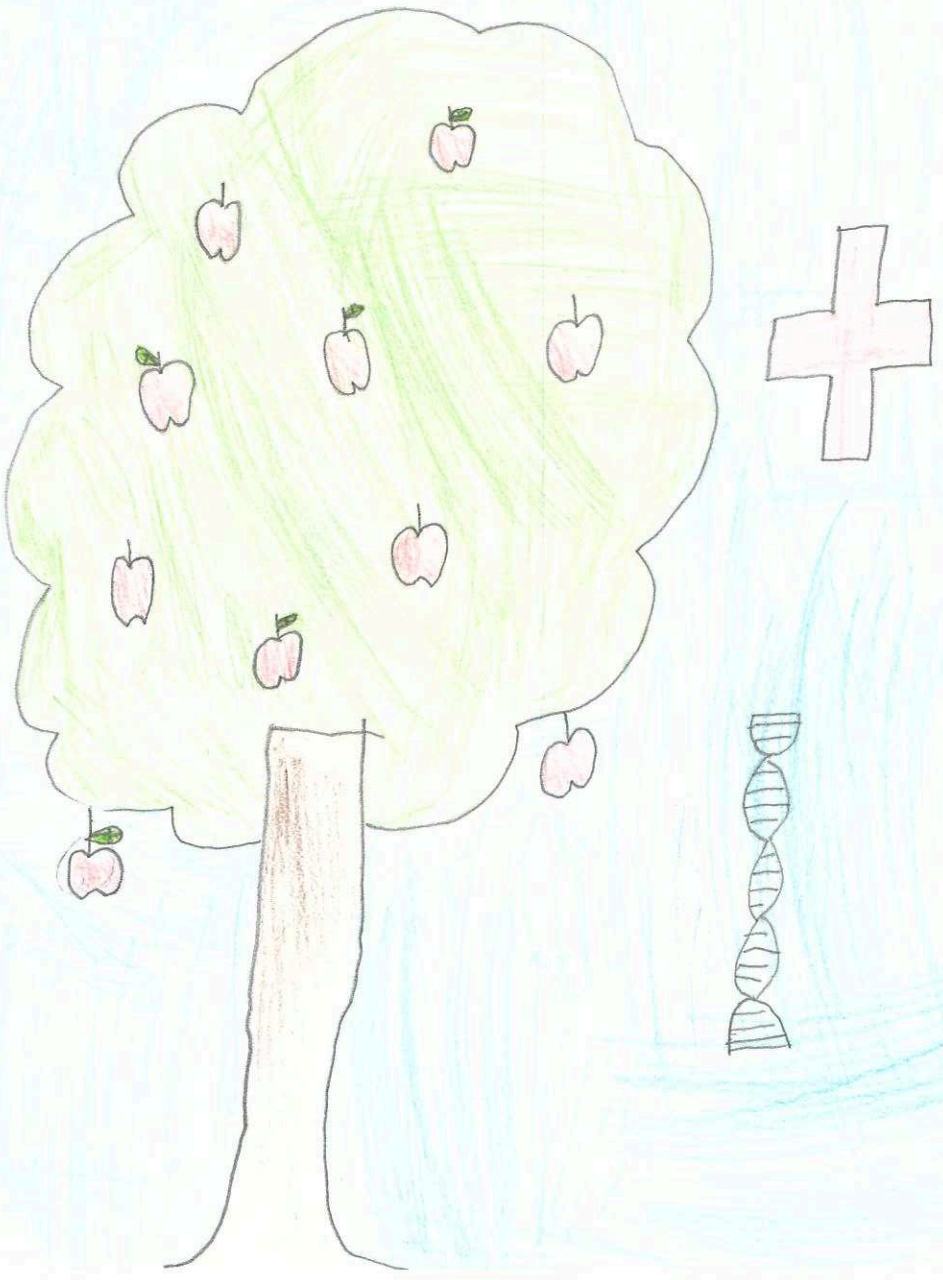
Next time, I'll obey my family.

Apples

They say an apple a day,
Keeps the doctor away.
If you get hay fever,
You will have a bad day.
Polyphenols in apples,
Help prevent the sickness.
And don't worry,
You can eat it with quickness.

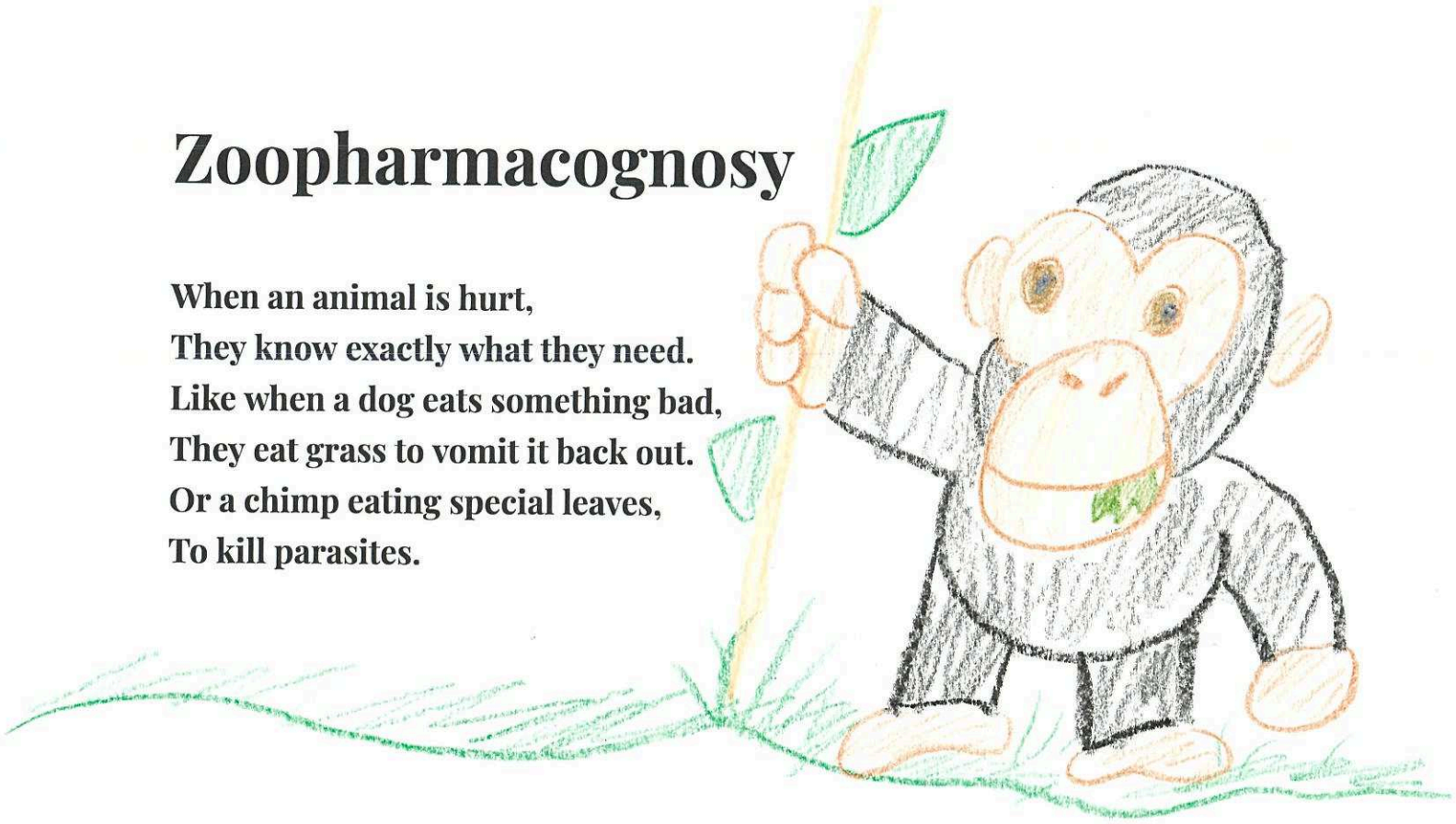






Zoopharmacognosy

When an animal is hurt,
They know exactly what they need.
Like when a dog eats something bad,
They eat grass to vomit it back out.
Or a chimp eating special leaves,
To kill parasites.



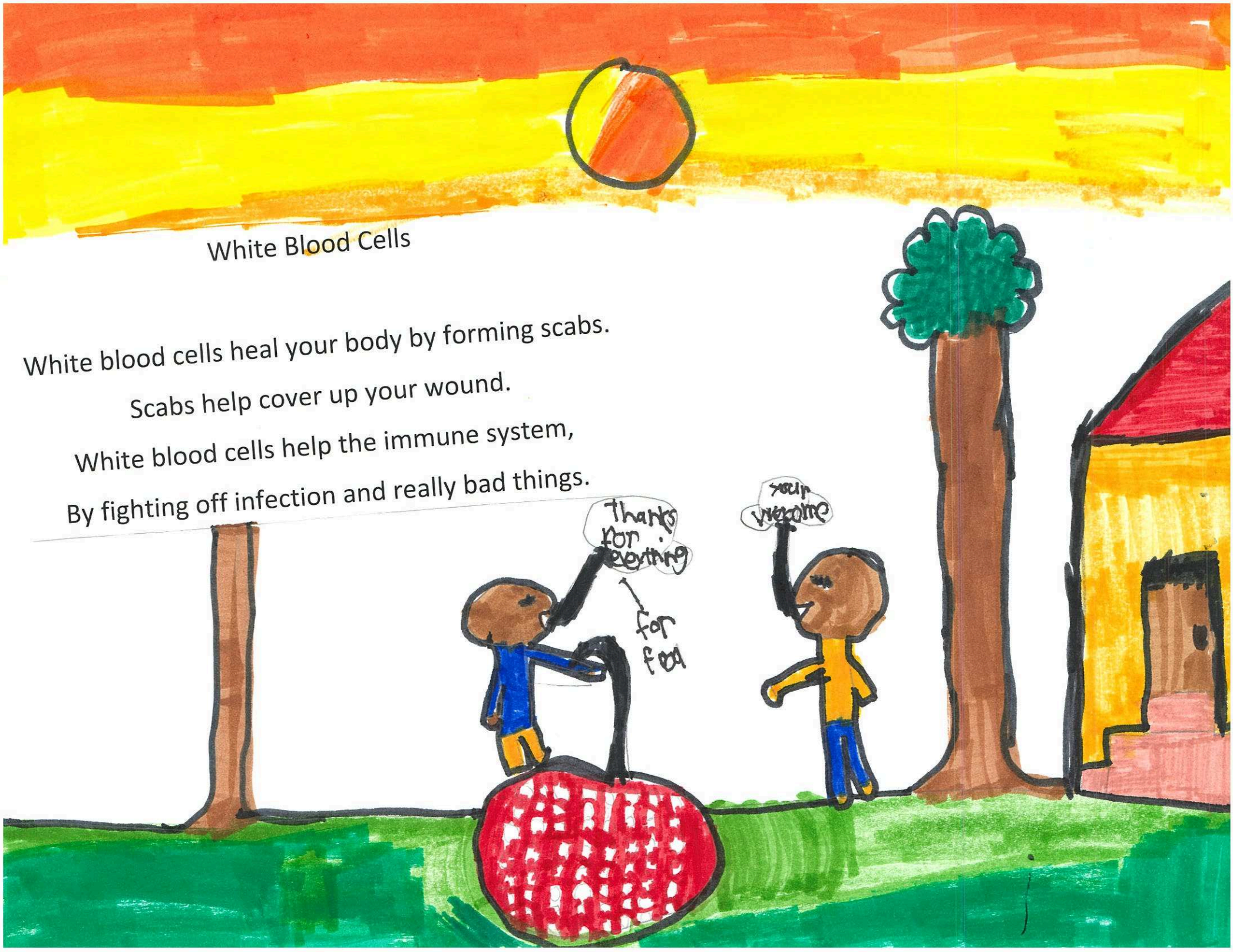
White Blood Cells

White blood cells heal your body by forming scabs.

Scabs help cover up your wound.

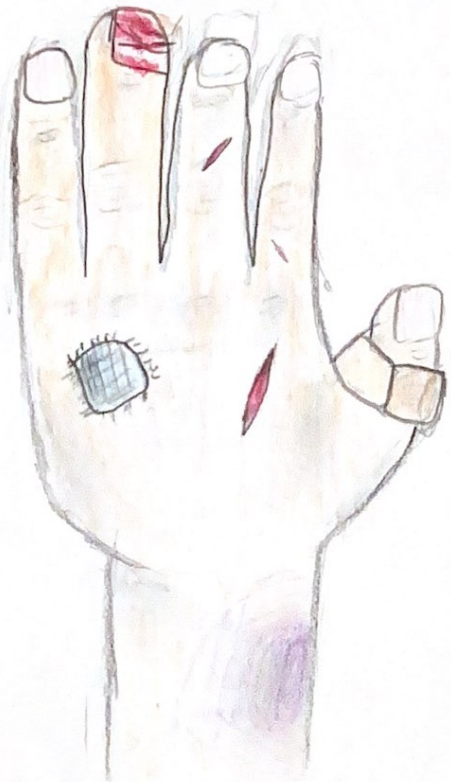
White blood cells help the immune system,

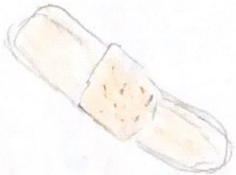
By fighting off infection and really bad things.

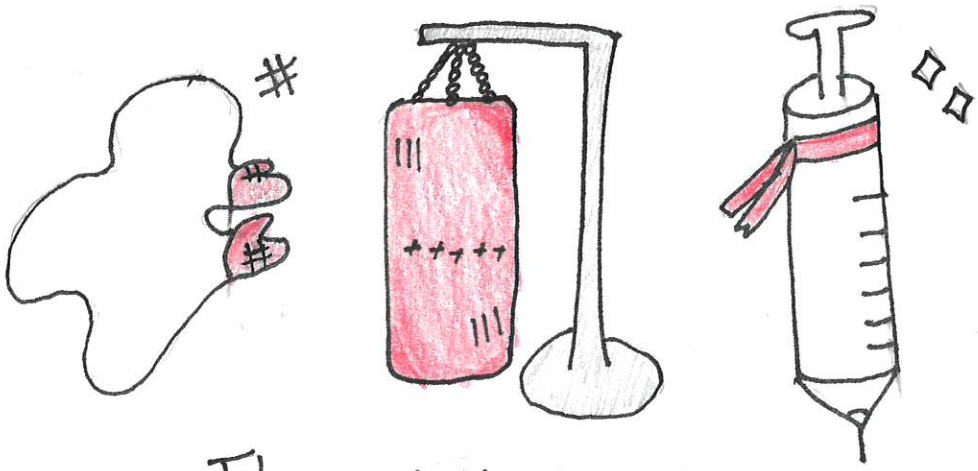


Chemistry Wound Healing

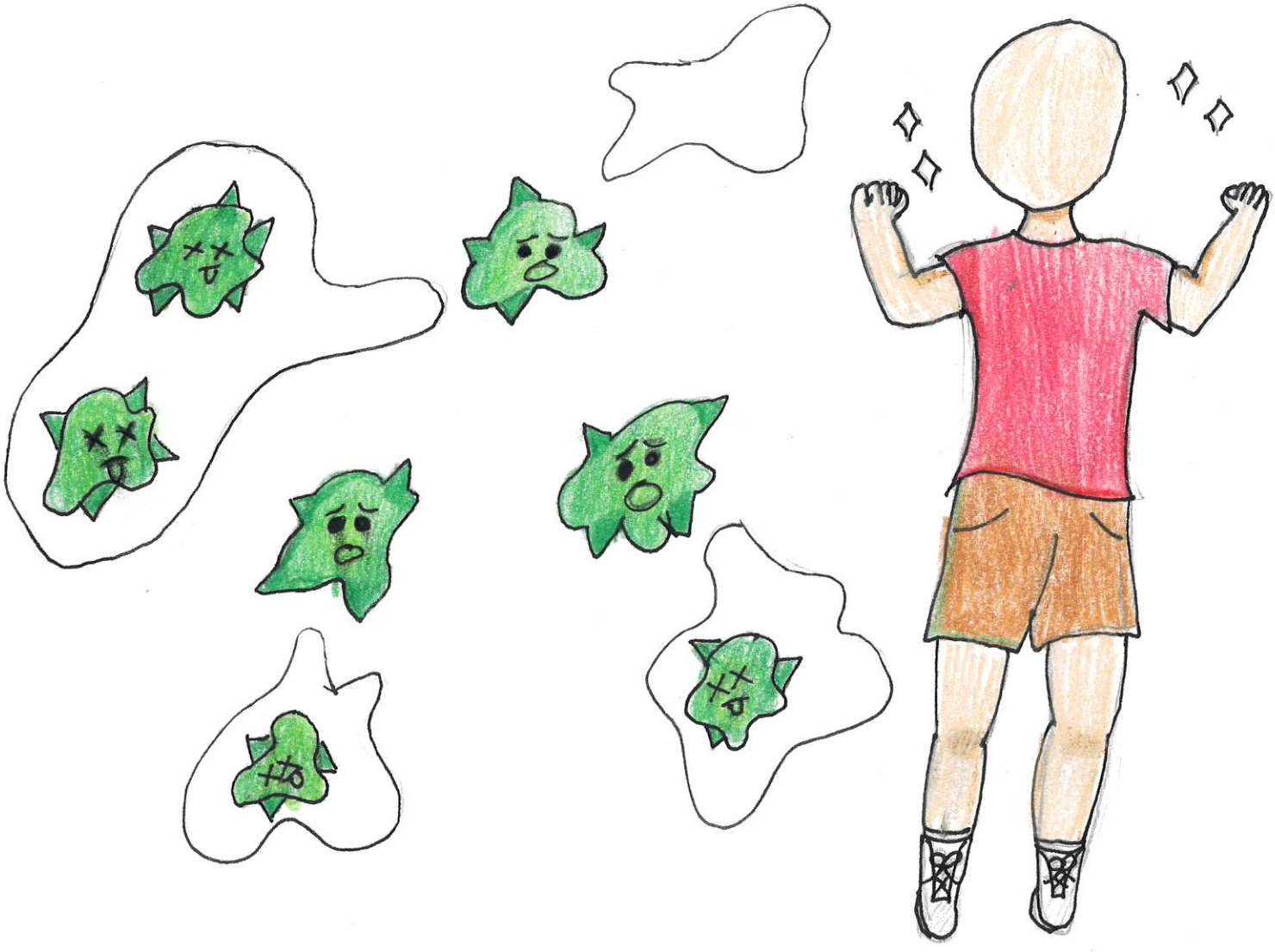
The wound stops bleeding and oxygen flows
Blood vessels heal and new tissue grows
Scars start to form and the wound becomes stronger
If a wound is bad, it stays longer
The wound heals and nobody knows







The white blood cells train with the vaccines
to keep the body healthy and clean
When the white blood cells are ready to advance
They will make sure diseases don't stand a chance



An Ode to Skin

Let's talk about skin anatomy and its great strategy

The biggest organ helps us protect our physicality

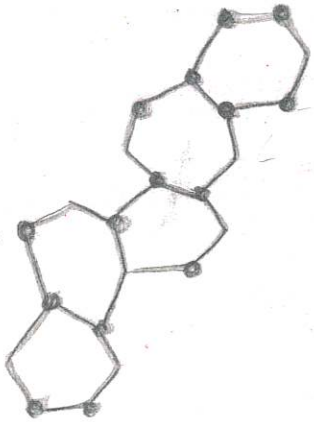
Sensation, mobility, endocrine activity

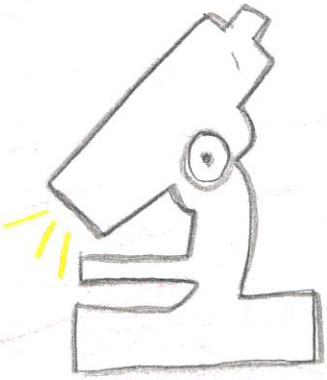
Temperature regulation and pathogen immunity

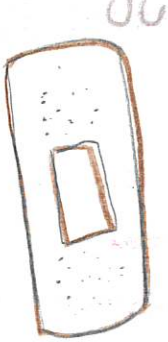
Germs won't hurt us, we've got the remedy

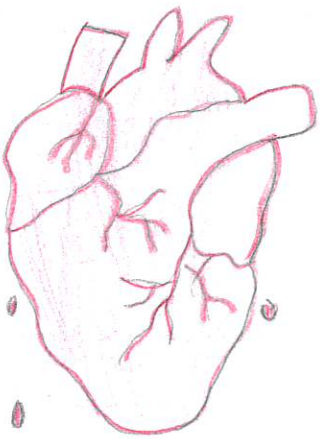
Skin is critical, protecting us relentlessly!

Chemistry, oh Chemistry with powers
So great,
In labs where elements dance and
twirl as the solution unfurls,
Chemistry the powerful healer,
In its fight, turns the dark
things bright,
Pills and potions, they create,
Battles illness, Changes all the fate
In every bond, every reaction
Lies the essance of its heating
ACTION









$2H_2 + O_2 \rightarrow 2H_2O$

Priya H.

Creating cures

Healing wounds

Elixir of Science

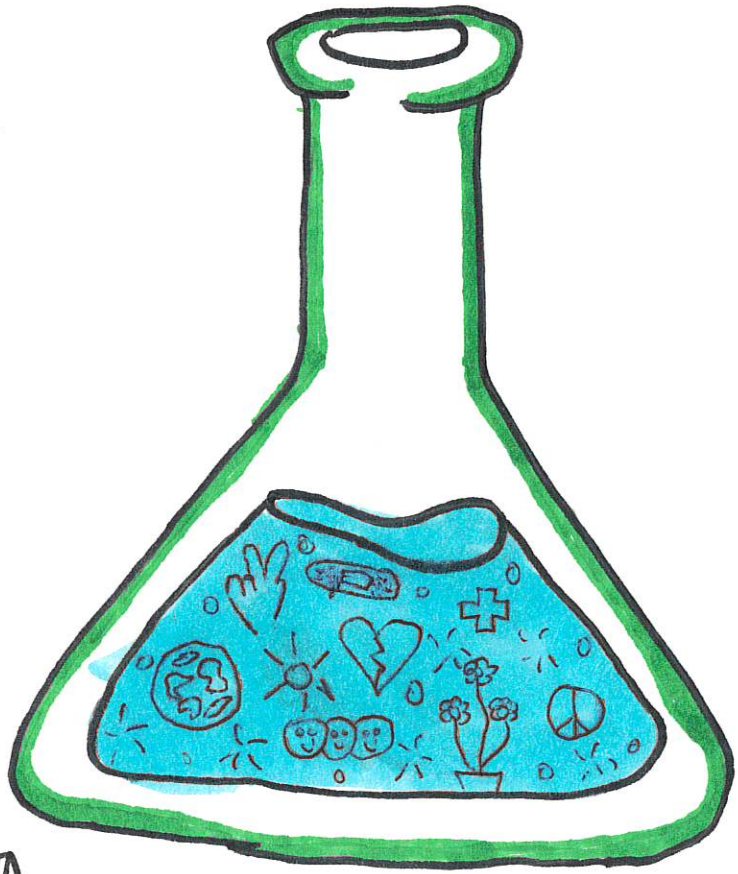
Mending flus

Improving lives

Solving pains

The power to heal

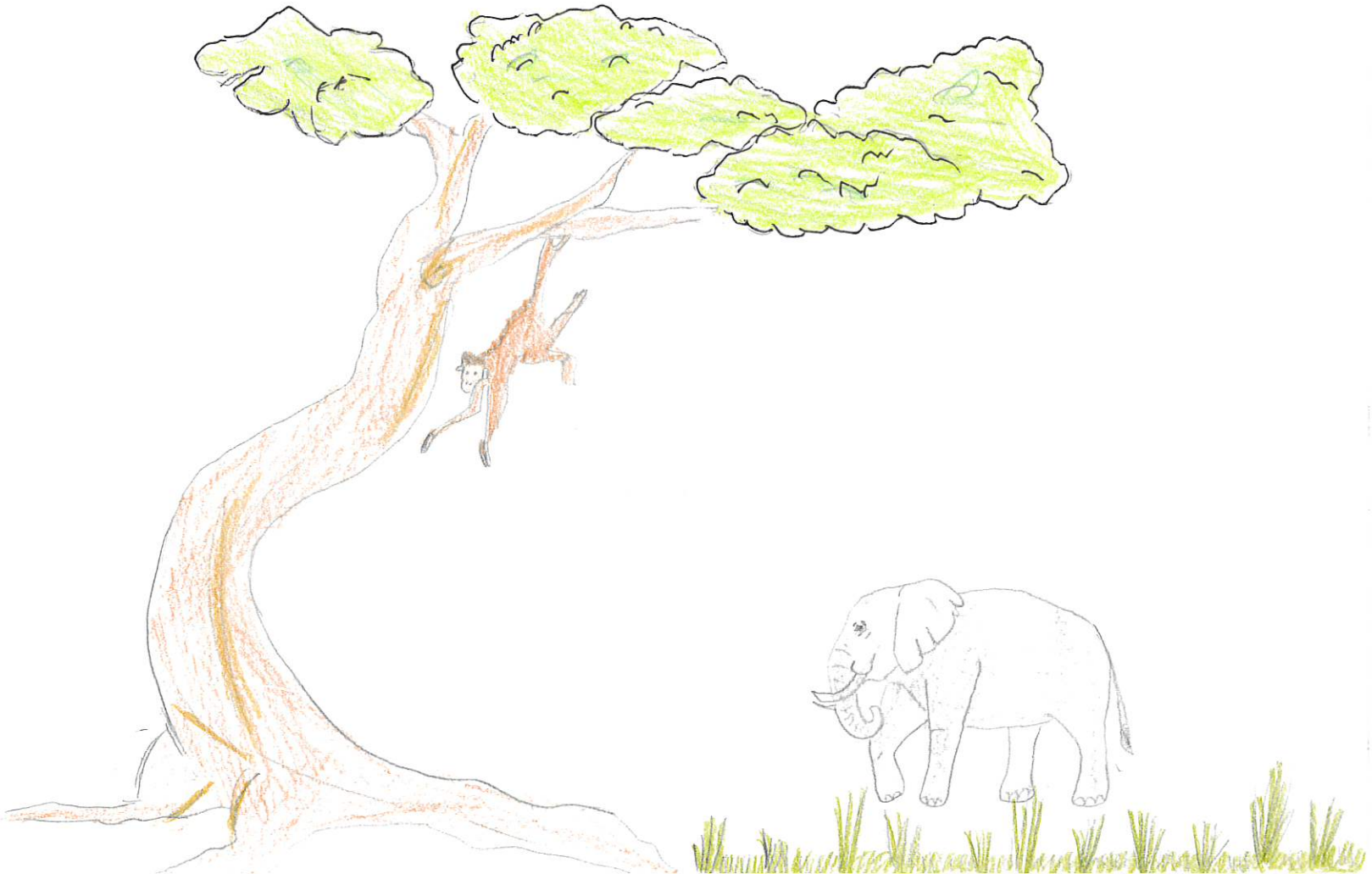
Reveals everything



Your life, my life would not be the same without chemistry to lead our way.

ZOOPHARMACOGNOSY

To Help Animals
Natural Medicine Can
Take Care of Their Needs

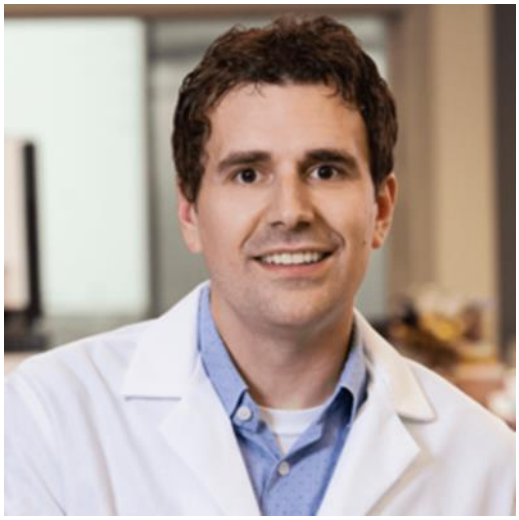


SSP/SACP Joint Meeting
Wednesday, January 17, 2024
Duquesne University Power Center

5:00 PM – Social Hour
6:00 PM – Dinner
6:45 PM – Business Meeting
7:15 PM – Technical Program

SSP Technical Program

"Diverse Applications of Compact Capillary LC"
Dr. James P. Grinias, Professor
Department of Chemistry & Biochemistry, Rowan University



Biography:

James Grinias is a Professor in the Department of Chemistry & Biochemistry at Rowan University in Glassboro, NJ. His research interests include improving the throughput and efficiency of chromatographic separations and the miniaturization of chemical measurement techniques. He received his Ph.D. from the University of North Carolina at Chapel Hill in 2014 and then moved onto a postdoctoral fellowship at the University of Michigan until the end of 2016. James has received a number of awards for his work to date, including the HPLC 2013 Csaba Horváth Award, the 2020 Young Investigator Award from the Chinese American Chromatography Association, a National Science Foundation CAREER grant, and the 2021 American Chemical Society Satinder Ahuja Young Investigator in Separation Science Award. He was also named to The Analytical Scientist's "Top 40 Under 40" Power List in 2018 and 2022. To date, he has published over 40 articles and given over 100 oral/poster presentations. He is also actively involved in the leadership of the Chromatography Forum of Delaware Valley and the American Chemical Society Subdivision on Chromatography and Separations Chemistry.

Abstract:

The use of portable and compact instrumentation has expanded the possibilities of integrating capillary-scale LC techniques into realms typically dominated by analytical-scale methodology. Low-volume detector flow cells and UV-LED light sources allow for improvements in absorbance detection for columns with internal diameters in the 0.1 – 0.3 mm range. Compact single-quad mass spectrometers with integrated vacuum systems also allow for LC-MS measurements when combined with compact capillary LC platforms. Considerations for column selection (in terms of length, internal diameter, particle size, and particle morphology) include pressure limits (both column and instrument), required efficiency for a given separation, and the balance between operating flow rate and the maximum volume that can be delivered from the pumping system in a single method.

We have employed compact capillary LC instrumentation in a wide variety of application areas that will be discussed. The analysis of pharmaceutical compounds has focused on QA/QC methodology (including impurity monitoring) and strategies for on-line reaction monitoring. Compact LC-MS has also been used for targeted screening of illicit drug compounds towards implementation in point-of-care settings. New instrument developments for temperature control along with the ability to connect the instrument to high resolution MS instrumentation have improve the ability to analyze antibody-based biopharmaceutical drugs. The common LC methods used in these and other application areas have the potential to be transformed through this technology that is greener and simpler to operate while still providing efficient chromatographic separations.

For complete details and to make a dinner reservation, please visit our society's website.
Deadline for dinner reservations is Wednesday, January 10, 2024 by noon.

https://chemistryoutreach.org/meeting/

The Crucible

The Crucible is published monthly, August through May. All statements and opinions expressed herein are those of the editors or contributors and do not necessarily reflect the position of the Pittsburgh Section.

Editors: Alysia Mandato and Sarah Scrivener, crucible@pittsburghacs.org

2023 Pittsburgh Section Officers

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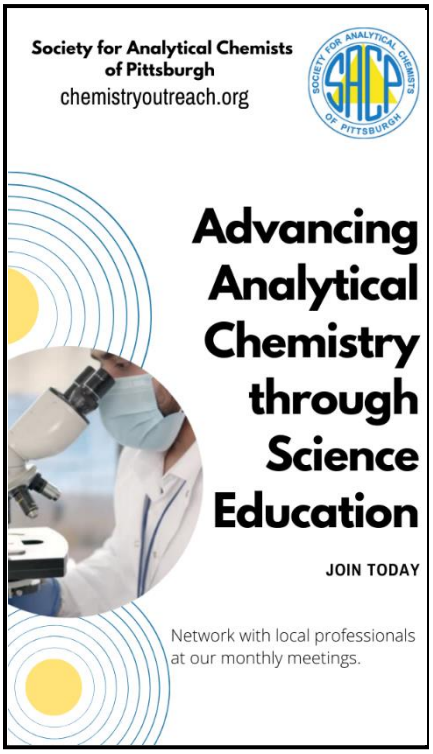

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The Crucible Deadline

The deadline for items submitted to The Crucible is the 25th of the month prior to publication. For example, all items for the February 2023 issue must be to the editor by January 25th, 2023.

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More information can be found here