Newsletter June 2019

Silicon Valley Chemist

Silicon Valley Section American Chemical Society

Volume 41 No. 6

JUNE 2019 NEWSLETTER TOPICS

Connect with Chemists

An early morning chat with fellow chemists

Thursday, June 20th, 2019, at 7-8 am

Coupa Café, 538 Ramona Street, Palo Alto

Contact Ean Warren (*ewarren@scvacs.org*) for more information or ask for ACS at Coupa.

Reminder **SVACS and Golden Gate Polymer Forum 2019 Joint Event** Reminder

Skin-Inspired Electronics

Professor Zhenan Bao of Stanford University

Abstract

Skin is the body's largest organ, and is responsible for the transduction of a vast amount of information. This conformable, stretchable, self-healable and biodegradable material simultaneously collects signals from external stimuli that translate into information, such as pressure, pain, and temperature. The development of electronic materials, inspired by the complexity of this organ is a tremendous, unrealized materials challenge. However, the advent of organic-based electronic materials may offer a potential solution to this longstanding problem. In this talk, I will describe the design of organic electronic materials to mimic skin functions. These new materials and new devices enabled arrange of new applications in medical devic-

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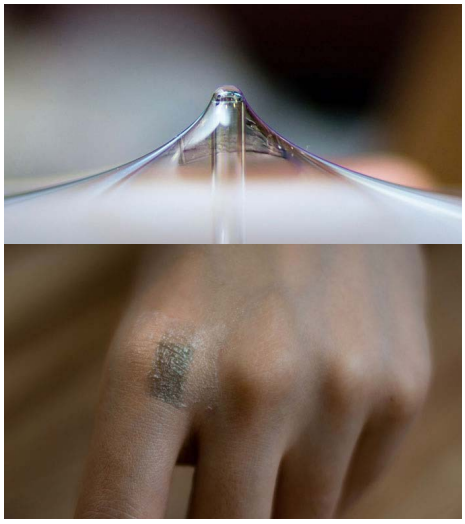
Professor Zhenan Bao



Images of stretchable organic transistors. Image credit: Amir Foudeh, Jie Xu, Sihong Liu of Bao Group, Stanford University

SVACS Annual Picnic, Wine and Beer-Tasting, and Awards Ceremony

Date: Saturday, July 13, 2019

Time: 4:00 pm Wine and Beer-Tasting
5:30 pm Barbecue Dinner
catered by Armadillo Willy's
7:00 pm Awards

Deadline for Reservations: Wednesday, July 8, 2019

Location: Stanford University Chemistry Gazebo behind the Sapp Center for Science Teaching and Learning *Map*

Registration: *https://www.brownpapertickets.com/event/4251741*

Cost: Adult: $20.00 Student: $10.00 Children under age 12: $5.00

SVACS and Golden Gate Polymer Forum 2019 Joint Event

Date: Thursday, June 27, 2019

Time: Please note earlier start time
5:30 PM social hour
6:30 PM dinner
7:30 PM lecture

Speaker: Professor Zhenan Bao
Stanford University
Skin-Inspired Electronics

Location: Michael's at Shoreline
2960 N. Shoreline Blvd
Mountain View, CA 94043
www.michaelsatshoreline.com

Menu: Broiled salmon, Lemon beurre blanc
Breast of chicken, Coq au vin
Grilled vegetable brochette with wild rice

Registration: *http://ggpf.org/events/*

Skin-inspired Electronics, continued from front page

es, robotics and wearable electronics.

Biography

Zhenan Bao is a K.K. Lee Professor of Chemical Engineering, and by courtesy, a Professor of Chemistry and a Professor of Material Science and Engineering at Stanford University. Prior to joining Stanford in 2004, she was a Distinguished Member of Technical Staff in Bell Labs and at Lucent Technologies from 1995-2004. She received her Ph.D in Chemistry from the University of Chicago in 1995. She has over 450 refereed publications and over 60 US patents. She pioneered a number of design concepts for organic electronic materials. Her work has enabled flexible electronic circuits and displays. In her recent work, she has developed skin-inspired organic electronic materials, which resulted in unprecedented performance or functions in medical devices, energy storage and environmental applications.

Bao is a member of the National Academy of Engineering and the National Academy of Inventors.

Bao was selected as one of Nature's Ten people who mattered in 2015 as a "Master of Materials" for her work on artificial electronic skin. She was awarded the ACS Award on Applied Polymer Science 2017 and The L'Oréal-UNESCO For Women in Science Award in the Physical Sciences 2017.

Bao is a co-founder and on the Board of Directors for C3 Nano and PyrAmes; both are Silicon Valley venture-funded start-ups.

Chemistry Quiz

What is the name for the reaction between amino acids and reducing sugars responsible for giving browned food, such as seared meat and baked bread, their distinctive color and flavor?

The answer will appear in next month's newsletter.

Last Month's Chemistry Quiz

Who discovered oxygen in 1774?

It is commonly believed that oxygen was discovered independently by Carl Wilhelm Scheele, in Uppsala, Sweden in 1773, and Joseph Priestley in Wiltshire, England, in 1774.

Chair's Message

Grace Baysinger

Greetings! Hope that this message finds you in good health and spirits. I'm pleased to announce that Pastel Schway, 9th Grade, who attends Connections Academy, took first place in the ***Chemists Celebrate Earth Week Illustrated Poem Contest*** for Grades 9-12 (see page 6).

Upcoming events: ***Citizen Science in Silicon Valley*** will include an informal seminar and tour at Biocurious, the world's first hackerspace for bio, on June 15th from 10:30-11:30am. ***Skin-Inspired Electronics*** by Zhenan Bao, Department Chair and Professor of Chemical Engineering at Stanford University, is the speaker for a jointly sponsored dinner meeting with the Golden Gate Polymer Forum on June 27th. To get ready for Zhenan's presentation, see this ASAP article that she co-authored on ***Polymer Chemistries Underpinning Materials for Skin-Inspired Electronics***. Published May 13, 2019, in Macromolecules, it was selected as an ACS Editor's Choice article which makes it openly accessible to everyone.

Come join us for the ***Annual SVACS Awards Picnic and 50+ Year Member Recognition*** that will be held at Stanford on July 13th. This event will be catered by Armadillo Willy's and will include beer and wine tasting for people who are at least 21 years old. Chemistry & Water is the theme for the ***ACS National Meeting and Exposition*** that will be held in San Diego on August 25-29th.

New and noteworthy content on the ACS website: ***ACS Publications*** has three posters and a brief report that may be of interest: ***Top 10 Tips for Ethical Authorship***, ***Top 10 Poster Presentation Tips***, and ***Top 10 Tips for Preparing Your Manuscript***, and ***Journal Citation and Impact Reports***. ***Mastering the Art of Scientific Publication: A Virtual Issue of Editor Tips for Authors Mastering the Art of Scientific Publication*** is an excellent collection of articles. The ***ACS Committee on Patents and Related Matters*** has published ***What Every Chemist Should Know About Patents (Fourth Edition, 2019)*** that will be useful to industrial and academic chemists. ACS recently published a web page on ***Chemical & Laboratory Safety*** that provides tools to help foster a culture of safety in your classroom, campus, or lab.

In celebration of the International Year of the Periodic Table (IYPT2019): ***Elements in Your Life*** is an informative poster collection created by Attila Pavlath, the 2001 President of ACS, and a member of ACS' California Section. Go to the Exhibition section of the website to download the posters. They are available in Arabic, Chinese, English, Portuguese, Turkish, and Ukrainian. Compiled by Carmen Giunta and James Marshall, the ***ACS Division of the History of Chemistry*** (HIST) has made ***Places of the Periodic Table***, an interactive searchable map of places associated with the developers of the periodic table and with the chemical elements with links to further information, available on the HIST website. An article on ***Assembling the Modern Periodic Table: The Messy Road to Periodic Chemistry*** by Julianna Poole-Sawyer that was published ***inChemistry***, the ACS Student Member Magazine, is worth checking out. The ***HathiTrust Digital Library***, a partnership of academic and research institutions, offers a collection of millions of titles digitized from libraries around the world. If you search "***Chemical Elements***" 729 titles are retrieved, with the full-text available for 360 of the titles.

Please contact us: Let us know how we are doing or if you would like to become more involved in the ACS Silicon Valley Section activities. A volunteer organization, we have jobs that are large and small. Please fill out this ***contact us*** form or send me an email message.

Many thanks for being a member of ACS!

Grace Baysinger
ACS Fellow
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BioCurious + SVACS

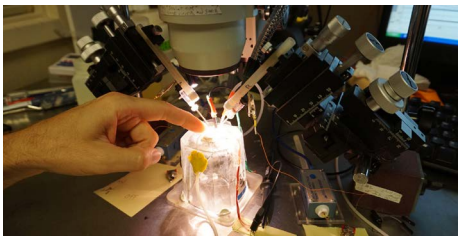
Citizen Science in Silicon Valley

Saturday, June 15, 2019 10:30 - 11:30AM

BioCurious, 3108 Patrick Henry Drive, Santa Clara, CA 95054

The Rise of Citizen Bioscience - a recent Scientific American article - chronicles the emergence of DIY science laboratories. Particularly active in the biosciences, these sites of multigenerational teams of citizen scientists collaboratively turn their strategies and goals into bio-constructs.

Silicon Valley is home to one of the most renowned citizen science laboratories: ***BioCurious***.



On Saturday morning, June 15, BioCurious will lead an informational seminar and lab tour for Silicon Valley ACS members, friends and colleagues. One goal of the morning program is increased interaction between chemists and BioCurious experimentalists. What form could this activity take? Read on.

BioCurious started in a garage as a space to do cancer research. It recently moved into a 6500 sq. ft. space in Santa Clara. It is a place where young and old can be involved in science - entrepreneurs, citizen scientists, hobbyists, and students.

Membership affords access to co-working laboratory spaces, shared equipment, and expertise. People can attend the research meetings of community projects and see how science is done without joining BioCurious. The Dwarf Cuttlefish project inspires students to learn lab skills such as cell culturing. The ***Open Insulin project*** has attracted collaborators from around the world. A large number of students do science fair projects in the BioCurious space. For example, the experience accrued in a high school science fair project got a college freshman a spot in a graduate research lab. Some come to learn new things, others to be exposed to the excitement of discovery. With no formal scientific training, one member has become an expert on Crispr and was profiled in ***Nature***. Volunteers take on a range of roles at BioCurious, from office work to research mentors, allowing BioCurious to keep operational and membership costs low.

What might you want to do there?

To attend the tour and informational seminar, please ***register***.

Attendance is free but space is limited.

BioCurious

The world's first hackerspace for bio, built in the heart of Silicon Valley is a community of scientists, technologists, entrepreneurs, and amateurs who believe that innovations in biology should be accessible, affordable, and open to everyone.

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Fermenting an Interest in Chemistry

Bubble Grant Award to Overfelt High School, East San Jose

by Ann Shioji

"Woop, bam, roll, cling!" These are the sounds coming from a high school chemistry class at Overfelt High School during the Atomic Structure unit. Students traditionally would learn about Rutherford's gold foil experiment through educational videos. Yes, videos and animations do have valid places in the chemistry curriculum, but wouldn't it be nice to use a hands-on, minds-on approach to learning atomic structure? That is exactly what the Bubble Grant from the Silicon Valley American Chemical Society allowed chemistry teacher Ann Shioji to accomplish at Overfelt High School this past fall semester. As a second part of the grant, in the spring semester, the students were able to taste the fruits of their labor for working all year by brewing their own root beer, adding their own spin on it, and then measuring how fermentation changes pH.

Students were engaged by this inquiry-based lesson to learn about the structure of the atom. How did they do this? By utilizing Obscertainers by Lab Aids, students had to use their critical thinking skills to decipher an unseen pattern of hidden mazes. Similar to a black box, the Obscertainers incorporate the skills necessary to implement the Next Generation Science Standards of using models, developing and testing hypotheses, and drawing conclusions based on indirect and direct observation. Students manipulated the box containing a steel ball and used sound to infer what the hidden shape inside the box looked like. After using indirect observation to develop an educated guess, students collaborated with each other to retest their hypothesis and come to a conclusion about the exact shape of the maze inside the Obscertainer.

Students could use any number of available materials (rulers, electronic balances, magnets), but they were not allowed to open the boxes to check their answers. Thus, the students had to apply the scientific method to visualize the box innards. Students were engaged in the activity to the point that they began designing their own experiments to test their hypotheses. This engagement carried over to increased enrollment in the district science fair from previous years.

Did the students gain a foundation of

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Fermenting an Interest, continued from front page

the scientific method? Here are some student testimonials:

"This was really fun. If this is what science is about, I think I'll do science fair this year." - Tasha V.

"I guessed right on 18 of the 20 boxes! It helped to be able re-test and collaborate with others." - Emilio E.

"Why didn't we get to do this last year?" - Eric H. (student who was enrolled in chemistry twice)

The second project supported by the ACS Bubble Grant centered on an acid/base unit. Students applied their familiarity with the scientific method to the lesson on acids and bases to literally taste in the lab: "What? We are actually allowed to taste this time?!" With parent permission, of course.

The smell of sweet success, the taste of victory: this is what the students in the chemistry classes at Overfelt High School were experiencing after a yearlong chemistry course. Students are traditionally taught not to taste anything in chemistry class, but thanks to a rare opportunity to taste provided by the Silicon Valley ACS, students tasted the fruits of their labor (provided their parents gave permission, of course!).

Students learned how root beer is produced, and they replicated this process in the lab setting. Before making their concoction, students learned about pH through the use of indicators and mini-labs. In making root beer, they then had a firsthand opportunity to see how yeast changes the pH of a solution through fermentation. They were also afforded the opportunity to see how different additives could affect the quality of their final product. Students were excited to observe how cacao nibs from different South American countries might affect the taste and texture of the final product, how flavorings such as vanilla, blackberry, or cherry might affect the pH of the root beer, and how citric acid might affect the amount of carbonation observed in the final product.

Students also applied their knowledge of stoichiometry to calculate the molarity of the sugar solution they made in the lab. It was quite an explosive day as evidenced in the pictures. The smiles on the students' faces ignited a love of learning and appreciation for the wonders of chemistry.

This project was so exciting that other teachers on campus wanted to take part, and now other chemistry classes will also get to brew root beer.

What will your students say? Enrich your curriculum and build the "ah" factor in your lessons by applying for an ACS grant today!

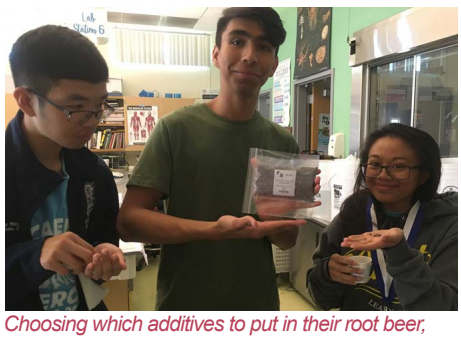
Students infer the design, experiment, and collaborate with peers to retest their hypothesis before coming to a conclusion about the pattern inside the Obscertainers.

Capping their bottles to withstand the pressure from carbonation.

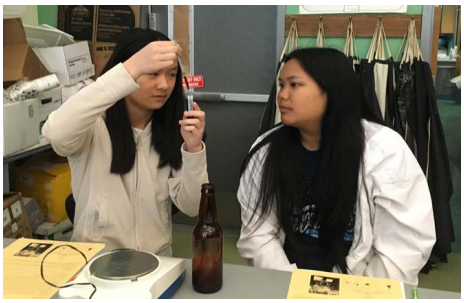
Students discover science teamwork.

Other teachers came to observe.

Some overfermented their product.



Choosing which additives to put in their root beer, such as cacao nibs from 3 different countries.



Students used calculations to measure ingredients.

Students roll and listen without seeing the pattern inside the Obscertainer.

Be aware of the meniscus!

Sidney Harris Cartoon

"Many of the select few who receive that call from Stockholm are, by that time in our lives, little more than spokesmen and spokeswomen. We start off on our life's journey as research scientists striving to catch hold of the coattails of the great and good, only to come to the realization, before too long, that we have reached our sell-by-date. In this Sidney Harris cartoon, the likes of me finds oneself at the podium, acting as the mouthpiece for a long line of accomplished young whippersnappers who have sustained and promoted my reputation - to the point where I am left holding a hot potato, thanks to all of them."

— Fraser Stoddart, Northwestern University, *Shared the 2016 Nobel Prize in Chemistry with Jean-Pierre Sauvage and Bernard L. Feringa*

Welcome to the Silicon Valley Section of ACS

Each month, the section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest members -- students. To welcome you to the section and get to know you, the Executive Committee offers new members a free dinner! To encourage you to attend a monthly section seminar meeting, we would like you to be our guest. When you register, make certain to mention that you are a new member and you and a friend will be our guests. The seminar meetings are held at a number of local venues. If you are unable to attend in the evening, perhaps you would join us for an outreach event, like judging a science fair, proctoring the Chemistry Olympiad or participating in a National Chemistry Week event in October. Then, there is our annual wine tasting and awards picnic in July. The local section is a volunteer organization. Please attend an event, volunteer to help and get to know your local fellow chemists. Welcome!

New SVACS Members

Patricia Aalbregtse
Daniel Enrique Acevedo Cartagena
Dr. Olga Alekseeva
Dr. Melvin Auerbach
Priyanka Bhattacharya
Erin Bjornsson
Jennifer Co
Maria Demireva
Professor Joseph M. DeSimone
Jeremy Herman Dworkin
Allen Lloyd Edwin
Mingxi Fang
Elizabeth Hecht
Dr. John F. Heil Jr.
Dr. Charles Frederick Howell
Dr. James L. Jezl
Anthony John Kolk Jr.
Leilah Renee Krounbi
Dr. Joe B. Lavigne
Dr. James F. LeBlanc
Shuxuan Li
Xizhen Lian
Dr. Zheng Liang
Anqi Ma
Anna M. Michalak
Enrique Moya
Dr. Joel Myerson
Dr. Mehdi Namazian
Barrett S. Nelson
Kelly Van Nguyen
Victor W. Or
Hochebori Ouatara
Richard Pastor
Addison Polcyn
Michael Poltash
Tyler Matthew Porter
James Stephenson Pyke
Marleny Ramos
Dr. Chris Regens
John Reidy IV
Natalie Seitzman
Rodney Simpson
Jacquelyn Joy James Stearns
Dr. Liheng Wu
Anton Zaytsev
Anyi Zhang
Zhipeng Zhang
Liwei Zheng

2019 Outstanding High School Chemistry Students

By Sally Peters

On April 27th, 15 of Silicon Valley's top high school chemistry students met at the chemistry department of Santa Clara University to compete in the national testing for the 2019 International Chemistry Olympiad. They were joined by 16 students from the California ACS section for a grueling day of exams.

The students gave up a beautiful Saturday to spend six hours indoors working on problem sets, multiple choice questions, and the 'killer' lab unknowns. On the lighter side, the students decorated their lab coats with their favorite element in honor of IYPT.

This year 27 high schools and over 275 Silicon Valley ACS section students participated in the local standardized exam at their high schools. The top scorers then represented our section in the national exam. No more than two students from a high school can participate in the national exam. Some schools gave the local exam to all of their AP or honors students as a warmup for the AP exam that is given in May. Other schools administered it only to interested students. The ACS national exam given on the 27th was sent to national ACS for the ACS Olympic committee to grade. This national committee, composed of about 40 professors and teachers, has over 1,000 exams to grade and compare!

The 1,000 students who participated nationwide on the weekend of the 27th are narrowed down to the top 20 students in the country. Those students will attend an intensive study camp at the Air Force Academy for two weeks in June. From those 20 students, four will be chosen to represent the U.S.A at the 51st International Chemistry Olympiad in Paris, France, July 21-30, 2019.

Go to ***https://www.acs.org/content/acs/en/education/students/highschool/olympiad.html*** to test your chemical knowledge on the exams in which these students participated! And to see the names of the 20 finalists who will attend the study camp. Our section did not have a national finalist this year, but for the first time in several years, the California section has 2 students who qualified to attend the study camp. In previous years our Silicon Valley section has had students attend the study camp and compete

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Outstanding Students, continued from previous page

in the international competition. The student rankings by High Honors and Honors have not been released yet.

Our section participation in the Chemistry Olympiad competition would not be possible without the help of several volunteers. A big thanks goes to Malati Raghunath, who was especially helpful when I was away at the ACS national meeting during the pretesting time in March. Bruce Raby came out of retirement to help Howard Peters and Malati proctor the exams and the lab. The section is very appreciative of Dr. Linda Brunauer for making the arrangements for using the facilities at Santa Clara University, collecting the equipment and chemicals needed, and setting up the lab for the 31 students participating! She has volunteered to do this for at least 15 years.

Also a very special thanks goes to the high school teachers who make it possible for their students to participate. They gave up personal and classroom time to communicate the program, organize the testing, and grade the local exams. The scores of our top 14 students ranged from 46 to 55 out of 60.

The 2019 Silicon Valley section outstanding high school chemistry students and their teachers are:

Carlmont H.S. – *Sophia Wolczko – Felix Guzman*
Cupertino H.S. –*Ralph Wang – Larry DeMuth*
Fremont H.S. – *Justin He – Anita Wu*
Gunn H.S. – *Miranda Yu – Heather Mellows*
Harker School – *Kalyan Narayanan – Robbie Korin*
Kings Academy – *Brendan Peercy and Jonathan Liu – Jason Rosé*
Leland H.S. – *Kelly Cui and Rishab Satyakaal – David Hall*
Lynbrook H.S. – *Jonathan Huang and Andy Han – Lester Leung*
Monta Vista H.S. – *Calton Kong – Kavita Gupta*
Palo Alto H.S. – *Esther Cao and Sonny Young – Ashwini Avadhani*
Saratoga H.S. – *Jeffrey Xu – Janny Cahatol*

Additional high schools that participated in the local exam were: Basis Independent, Bellarmine Prep, Evergreen, Fremont, Hillsdale, Los Altos, Menlo School, Mercy High, Mitty, Mountain View, Notre Dame, Nueva School, Peach Blossom, Piedmont Hills, Pinewood, St. Francis, Sacred Heart, San Mateo, University Preparatory, and Valley Christian.

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Chemists Celebrate Earth Week 2019

Silicon Valley ACS at Library

The Silicon Valley Local Section celebrated Earth Week with an event held in the San Jose public library. We talked with members of the community about the chemistry of paper while helping them fold origami. The paper-folding activity was a "fortune teller" or "cootie catcher" like the ones made by kids in middle school. We called the Earth Week activity a "Chem Catcher." Once folded, the Chem Catcher had information about chemistry and paper. It was a fun way to reach out and engage the community in chemistry!

One SVACS member was joined by five San Jose State University students. We were in the library for about two hours and talked with about 60 people. We had fun conversations, some in different languages including Spanish and Vietnamese.

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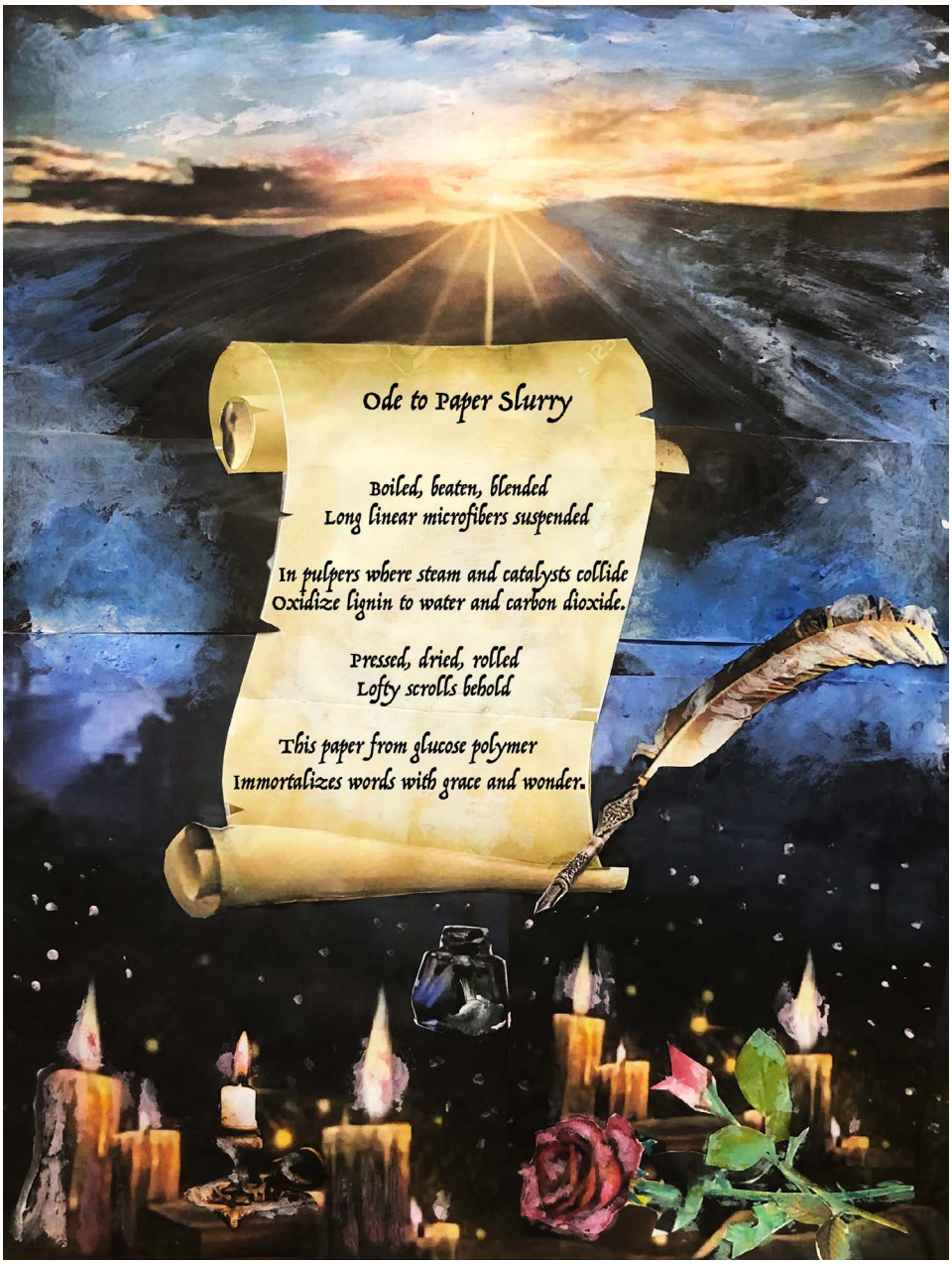
CCEW Student Poetry Contest Winner

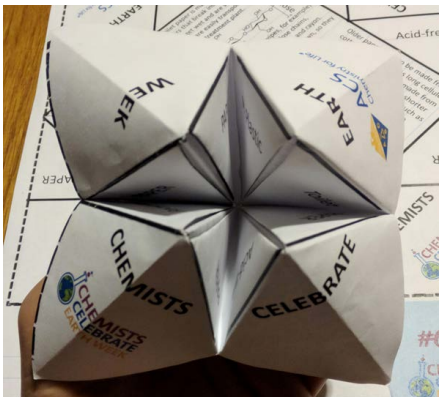
Congratulations to **Pastel Schway**, a 9th grader from Connections Academy, for winning the Chemists Celebrate Earth Week poetry contest! Her entry won from our local contest and was sent to the national contest where it won 1st Place in the Grade 9-12 category. We are very proud to have such great talent represented by our local section!



CCEW 2019, continued from previous page

Directions for folding your Chem Catcher:

1. Cut out the square along the dotted line
2. Fold diagonally from corner to corner twice (making an "X" in the middle).
3. Lay flat and unfolded with the text facing away from you.
4. Fold each corner into the middle of the X.
5. Turn the paper over and repeat, folding each new corner into the middle of the X.
6. Fold the square in half and work your fingers into the four corners.
7. Learn about chemistry of paper!



EARTH

ACS Chemistry for Life

Toilet

PAPER

CELEBRATE

vs. Plastic

Acid-free

WEEK

PAPER

CHEMISTS

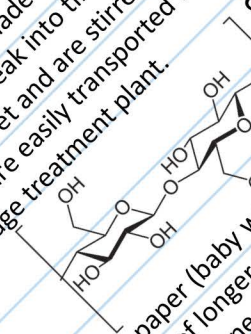
PAPER

Recycling

PLASTIC

Made from crude oil or natural gas (non-renewable)
Styrene / propylene polymer
Fairly cheap to produce
Able to be molded
Not biodegradable
Water-resistant

Toilet paper is made of short cellulose fibers that break into tiny pieces when they get wet and are stirred (flushed). These are easily transported to the sewage treatment plant.



Other paper (baby wipes, for example) is made of longer cellulose chains, polypropylene, polyester, and rayon. They do not easily break down, so they clog the pipes instead.

Older paper used to be made from cotton, which contains long cellulose strands. Newer paper is made from processed wood fiber with shorter cellulose strands. Chemicals such as alum are added to wood fiber to prevent ink from soaking through. Moisture in the air reacts with alum, creating acid that breaks down cellulose fibers, weakening paper. Acid-free paper includes calcium carbonate to prevent acid from damaging cellulose.

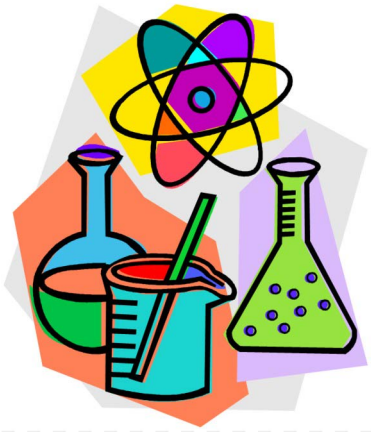
Recycled paper is 1) separated by type and grade, 2) washed to remove ink, 3) strained to remove staples and plastic, 4) mixed with chemicals to break it down, 5) chopped and heated to break into strands of cellulose (this is called pulp). 6) Pulp is mixed with new pulp from wood chips, 7) spread into thin sheets, 8) pressed with rollers, and 9) left to dry.

Made from trees (renewable) takes a lot of trees, water, and energy
Cellulose polymer
Able to be molded
Not water-resistant
biodegradable

PAPER

CHEMISTS CELEBRATE EARTH WEEK

SILICON VALLEY SECTION
AMERICAN CHEMICAL SOCIETY
P.O. Box 395, Palo Alto, CA 94302



To receive an email when our newsletter is published on our web site, sign up at:
http://svacs.org

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Treasurer	Ihab Darwish	650-624-1389	darwishis@yahoo.com

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2019-2021	Jane Frommer	408-927-2225	jane@collabra.net
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Newsletter

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ChemPloyment Abstracts

Director:	Liang Cao		liang.cao@aol.com

FUTURE EVENTS

Jun 15 Citizen Science in Silicon Valley
BioCurious openhouse and tour for SVACS
BioCurious, Santa Clara, CA
Register online

Jun 27 SVACS and Golden Gate Polymer Forum 2019 Joint Meeting
Professor Zhenan Bao, Stanford University
Skin Inspired Electronics
Michael's at Shoreline, Mountain View, CA
www.ggpf.org

Jul 7-13 AAUW and SVACS Tech Trek
Stanford University
nmcclure@drugregulatoryaffairs.com

Jul 13 SVACS Annual Picnic, Wine/Beer-Tasting and Awards Ceremony
Stanford Chemistry Dept., Stanford, CA
http://www.svacs.org

Sep 7 Flavors of Chemistry
Sacramento Local ACS Section
UC Davis

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