



In Conjunction with the American Chemical Society
Student Affiliates at the University of Pittsburgh



Volume 27, Issue 5

February 2, 2018



IT'S THAT TIME!

IMPORTANT DATES FOR REGISTRATION

- | | |
|--------------------|---|
| February 12 | Summer Term Registration (2187) begins for all degree students. |
| March 4-11 | Spring Break! |
| March 16 | Deadline for August 2018 (2187) graduation applications in 140 Thackeray Hall. |
| March 26 | Fall Term (2191) registration begins and your on-line registration appointment will be sent to you based on credits earned. |

Advisees who already have a permanent advisor should make their Summer registration appointments with their advisor on or after February 9th for Summer Term (2187).

Advisees who will be asked to select their permanent advisors (via an email to be sent February 5th) should do that after February 7th. See Dr. George C. Bandik or Regina Mahouski in 107 Chevron Science Center.

New advisees who have declared chemistry as their major within A&S should make an appointment with Dr. George C. Bandik, Dr. Ericka Huston for Dr. Michelle Ward after February 7th for Summer Term (2187) and March 12 for Fall Term (2191) in 107 Chevron Science Center.

2017-2018 ACS-SA Officers and Staff

Mitchell Harmatz-Co-President
Mariah N. Mascara-Co-President
Ryan Gilbert-Co-Vice-President
Alex Gerber-Co-Vice-President
Eric McElhinny-Co-Secretary
Alex Repko-Co-Secretary
David Newhouse-Co-Treasurer
Andrew Warburton-Co-Treasurer
David Pilsk-Outreach Coordinator
Stephanie Liu-Newsletter Co-Editor
Grace Rong-Newsletter Co-Editor

Andrew Warburton-Green Chemistry
Morgan Lennon-Tech Team
Justin Maier-Tech Team
Andrew Sassani-Tech Team
Shelby Szott-Tech Team
Caitlyn Choe-Senior Affairs Committee
Maddie Kash-Senior Affairs Committee
Stephanie Liu-Senior Affairs Committee
Coleman Pinkerton-Senior Affairs Committee
Brandi Williams-Senior Affairs Committee

Visit us at <http://www.chem.pitt.edu/acs-sa/>

C
H
E
M

M
A
J
O
R

N
E
W
S

Valentine's Day Triple Threat (But are they actually?)

Grace Rong, Newsletter Co-Editor



For many of us, February feels like an odd month. It is the shortest month of the year and the total number of days change depending on the year. It is also the year that seems to be one of the most dreaded all because of one holiday—Valentine's Day. I'm sure you will notice the same decorations and gifts appearing in storefronts—teddy bears of all sizes, heart-shaped boxes of chocolate, and just so much pink and red in general. If you are older, I'm sure red wine may be of consideration when it comes to Valentine's Day night. Now I ask you, have you ever wondered why it seems customary to give chocolates and gifts packaged in red or drink red wine at dinner?

Chocolate

Chocolate has been noted for its potential health benefits, such as being antioxidant-rich and a potential player in reducing high blood pressure. Two flavanols in chocolate may play a large part in why it is so commonly given during Valentine's Day. Theobromine and phenylethylamine are two prominent flavanols in chocolate that have been found to stimulate the neurotransmitters released by our brain—dopamine and serotonin. Theobromine acts on adenosine receptors in the brain that affect dopamine receptors. The molecule is an antagonist of adenosine receptors, so it promotes general arousal and prolongs the release of dopamine.² Phenylethylamine (PEA) has a high solubility in plasma and is able to easily cross the blood-brain barrier, easily stimulating the release of dopamine and serotonin.³

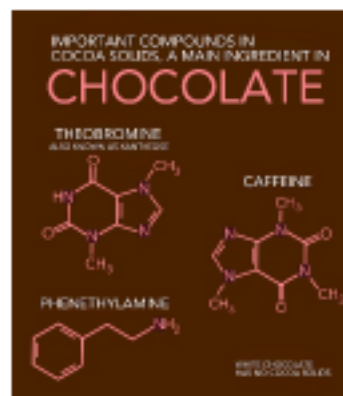


Figure 1. Chocolate and its compounds.¹

Red wine

Have no fear if red wine is not your drink of choice since it is not necessarily the color that dictates how romantic your night is, but rather the effect alcohol has on the brain (drink responsibly!). Alcohol easily enters the blood and has been found to interact with multiple neurotransmitter systems. These interactions trigger the release of endorphins, which are peptide hormones that activate the body's opiate receptors.⁴ This effect is what we commonly associate with feeling good and relaxed after a few drinks.

Color red

Red has many associations and these stem from color psychology. While red is related to aggression and power, it is also associated with attractiveness. Many studies have been conducted in which participants were asked to rate men or women as more or less attractive. In many of these studies, both men and women were rated as more attractive when wearing red than other shades. This may stem from a physiological connection where we think of redder skin, which may be a good indication of good circulation and overall good health and fitness.⁵

For those of you who are looking forward to celebrating with your special someone, you now have some fun facts to show off during dinner. If not, I say have no fear because after the 14th there will be so much candy on sale for 75% off or more.

References

1. <https://cen.acs.org/articles/94/i11/Periodic-graphics-chocolate-chemistry.html>
2. <https://www.quora.com/What-is-the-relationship-between-theobromine-and-dopamine>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3904499/>
4. <https://www.theatlantic.com/health/archive/2012/03/why-alcohol-makes-you-feel-good/254315/>
5. <http://www.bbc.com/future/story/20140827-how-the-colour-red-warps-the-mind>

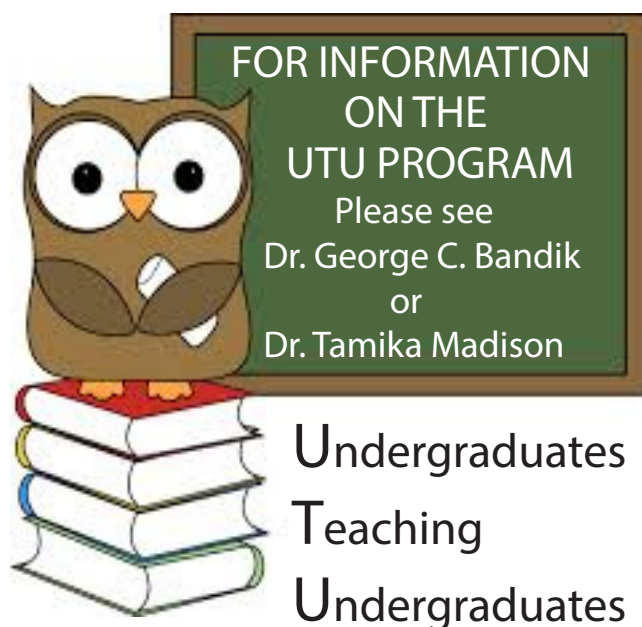
ACS-SA Spring Term Schedule FEBRUARY

February



- 02** *Opportunities in the Coatings Industry
with Mr. Tony Kingera, BS, Pitt*
- 09** *Preparing for our Valentine's for Veterans
Outreach Effort*
- 16** *Winter Celebration
RESERVATIONS REQUIRED*
- 23** *Meet Our New Faculty
with Dr. Yiming Wang*

Ever wonder what it is like on the other side of the podium? Becoming a UTU is great way to find out. As a UTU, you get the chance to teach General, Organic or Analytical Chemistry. It is a great experience, no matter what your career path is!



The Kenneth P. Dietrich School of Arts & Sciences

Summer Undergraduate Research Awards

The Summer Undergraduate Research Awards provide a \$3,500 stipend to conduct independent research over the course of the summer. Titles of recent SURA topics range from Internet Memes and Popular Culture to The Mirror and the Mind: Medieval Literary Mirrors and the Neuroscience of the Mirror Response. SURA recipients also enroll in a 12-week summer SURA course to learn how to communicate their research findings to a general audience.

As part of the summer awards program, all SURA recipients participate in an ethics workshop where ethics case studies are discussed with Dietrich School faculty and staff members from the Academic Resource Center and OUR. Because ethical concerns are inherent in every kind of research, the ethics workshop provides students, faculty, and staff with a meaningful opportunity to reflect on the kinds of ethical concerns that will guide young scholars far into the future.

Speak with your departmental advisor to learn how to apply for a SURA or call the OUR at 412-624-6828.

Application:

<https://www.asundergrad.pitt.edu/suraapp>

Deadline: February 26, 2018



Advice and a Bit of... Green Chemistry



by: Andrew Warburton, Green Chemistry Contributor

Hi guys! We're now in full swing for the semester! Remember to keep up with your coursework and that due dates in the syllabus are closer than they appear. Personally, I put everything on Google calendar to make sure I don't forget anything. Yes. I am a slave to technology. I'll be on the next episode of Black Mirror.

But now it's time to talk about everyone's favorite topic: Green chemistry and environmentalism. What I want to do in this article is to take a published paper in the *Green Chemistry Journal* from the Royal Society of Chemistry called "Bioplastics from vegetable and waste via an eco-friendly water-based process" (citation below) and talk about the implications it has on our lives. Just a refresher, Green chemistry is a collaborative effort to reduce waste and pollution in our environment by improving technologies in crop protection, commercial products, medicines, etc.

The paper discusses various way to reduce the amount of non-degradable plastics by substituting them for plastics derived from vegetable oil. Although that may seem rather pedestrian, this is a huge advancement for reducing lab waste. If you're doing research now or are even in one of the teaching labs, you may notice that there is a lot of plastic waste generated from the labs.

Here are some figures that I thought were very interesting. In the left panel, they generated several different biofilms using various vegetables (listed). The middle panel shows the cellulose matrix that they could generate using their methods. The figure on the right shows the effectiveness and strength (using Young's Stress-Strain Modulus) of the various bioplastics generated. They worked really well!

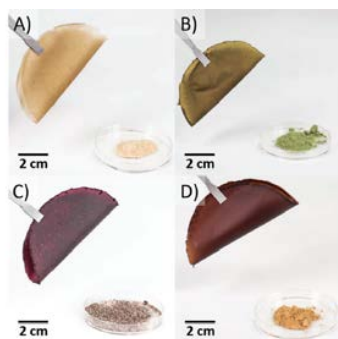


Fig. 1. Image of the bioplastic films obtained with our fabrication protocol and the original vegetable powder used in the process: (A) carrot bioplastic, (B) parsley bioplastic, (C) radicchio bioplastic, (D) cauliflower bioplastic.

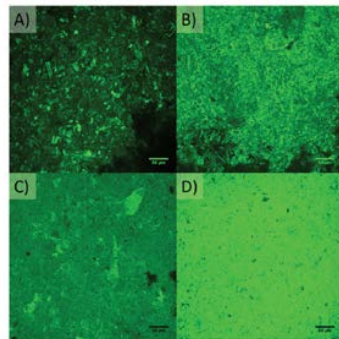


Fig. 2. Confocal images of the bioplastic films obtained with our fabrication protocol. (A) Carrot bioplastic, (B) parsley bioplastic, (C) radicchio bioplastic, (D) cauliflower bioplastic. The bioplastics seem to be composed of a matrix and crystalline cellulose dispersed in it.

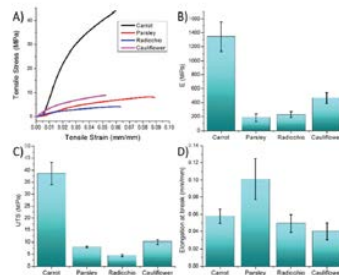


Fig. 3. Mechanical characterization of the bioplastic films conditioned at 100% RH. (A) Typical stress-strain curves for each of the four materials tested are shown: carrot, parsley, radicchio and cauliflower. Different vegetables yield bioplastics with different mechanical properties: the different histogram report the summary of: (B) Young's modulus, (C) UTS and (D) elongation at break for the bioplastics obtained from the four different vegetables. Values are reported also on Table S1.

If you have a couple of minutes, this paper is a great read and very digestible even for the lay-man such as myself! Implementing these biodegradable plastics with strengths similar to synthetic polymer plastics ubiquitous to labs today will help tremendously reduce plastics in landfills from research institutions all over the world.

Green chemistry research is happening everywhere, all over the country! It has helped reduce and improve many technologies ranging from drug production to transformer insulation. Although I don't expect everyone reading this to be a green chemist, I implore you to reach out to your lab and encourage conservation and waste-reduction. Large public institutions such as Pitt spend millions of dollars on waste disposal and reducing that will help save money and ultimately the planet.

References

Perotto, Giovanni et al. "Bioplastics from Vegetable Waste via an Eco-Friendly Water-Based Process." *Green Chemistry* (2018): n. pag. Web.

2018 Tripartite Symposium
ACS Student Affiliate Event



**Molecular Gastronomy – Science You can Eat and Drink !
and
Fe Chef ACS Student Affiliate Group Competition**

Trade in your lab coat and goggles for an apron and toque and try a new kind of experimentation!

Saturday, April 7, 2018

9:00 a.m. – 2:00 p.m

Carlow University, Department of Chemistry

3333 5th Avenue, A.J. Palumbo Hall of Science and Technology

We are looking for ACS-SA chapters to participate in an “Fe Chef” competition competing against one another using the techniques of Molecular Gastronomy!

Competition will be limited to the first FOUR chapters to respond indicating their interest in participating.
ALL CHAPTERS are welcome to attend the symposium to hear:

Dr. Subha Das, Associate Professor of Chemistry, Carnegie Mellon University

Mr. Kevin Sousa, Executive Chef and Owner, Superior Motors

Distillers from Wigle Whiskey Distillery

And others!

Learn about the science behind food and beverage!

Meet and network with other ACS chapters from local colleges and universities!

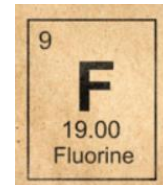
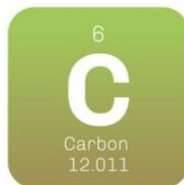
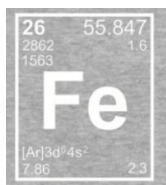
Become a member of the ACS Pittsburgh Local Section (professional development)

Win prizes and giveaways!

Sample offerings from local restaurants!

To reserve a spot in the Fe Chef Competition portion, please see the instructions on the following page.

May the best Student Chapter Win!



Fe Chef ACS Student Affiliate Group Competition

Participant Information

- Participation in the competition portion of the event is on a first come first serve basis. **The first FOUR ACS-SA chapters to indicate interest in participating will be chosen.** Chapters should send an email to **Dr. David Gallaher**, chairperson, Department of Chemistry, Carlow University with the following information:
 - Name of College/University, Name of Chapter Faculty Advisor, Names of FOUR chapter members who will be representing the team during the competition.
 - Send information to: dlgallaher@carlow.edu
- All local ACS-SA chapters who are interested may register for the Tripartite symposium, but due to logistical/space concerns, only the first four teams to indicate desire will be allowed to compete.
- If more than four chapters indicate interest in participating, those chapters will be put on a “standby” list for participation.
- In the weeks prior to the competition, the chapters involved in the competition will be provided with their “assignment” for the competition. Participating chapters will be sent a package consisting of:
 - Information on the techniques and reagents of molecular gastronomy.
 - Sample recipes.
 - Web addresses for in-depth research.
 - Trial size portions of selected reagents and samples of equipment used in molecular gastronomy techniques.
 - List of on-site equipment available in the food science laboratory at Carlow University.
- Chapters are to use the package to research and practice the techniques of molecular gastronomy and choose two techniques that can be incorporated and showcased in a single dish (creation).
- On the day of the event, the teams must prepare the chosen dish (creation) using the two chosen/practiced gastronomy techniques. Students will have access to the Food Science laboratory in the Department of Chemistry at Carlow University to prepare their dish. Teams may arrive prior to the start of the symposium events and begin their prep work/setup.
- **Chapters must purchase and bring their own ingredients (other than those reagents for gastronomy techniques which appear on the provided list) on the day of the competition, however these expenses will be reimbursed (up to a limit of \$75) upon submission of receipts.**
- Following the lunch break, the ACS-SA teams will briefly present their “product” to the audience and have ~5-7 minutes to explain the creative process and the science behind it. Teams may use a pre-prepared Powerpoint presentation to help explain the gastronomy techniques employed and the science behind them.
- Student teams will have their projects judged by the symposium speakers panel of experts in molecular gastronomy. Judging will be based on creativity, execution, and communication of the science behind the assigned technique(s). There will be monetary awards given for first (\$200), second (\$150), and third (\$100) places.

We are looking forward to seeing you at the event!

Questions? Please email dlgallaher@carlow.edu or call 412-578-2057

FUN and GAMES CORNER

Chemistry Word Search Puzzle

Nobel Prize-Winning Chemists

Uncover the secret message by finding the names of the chemistry Nobelists listed below. The names may appear horizontally, vertically or diagonally, forward or reverse.

P	Z	E	W	A	I	L	D	N	A	M	T	L	A	H
R	R	E	L	G	E	I	Z	R	C	R	A	M	E	S
I	N	N	A	M	F	F	O	H	A	C	P	R	L	U
G	J	O	L	I	O	T	R	R	U	W	Z	I	E	C
O	A	K	A	N	A	T	E	R	H	B	D	T	H	R
G	F	U	K	U	I	N	I	A	E	Z	A	O	N	A
I	E	D	E	E	R	E	L	R	S	U	P	G	O	M
N	C	E	I	E	R	O	G	E	B	N	O	N	P	W
E	L	N	W	C	E	N	A	E	H	O	L	I	R	H
G	R	O	B	A	E	S	S	T	A	T	A	L	E	A
Y	T	R	E	B	L	I	G	T	H	R	N	U	L	B
Y	E	L	L	A	M	S	O	R	N	A	Y	A	O	E
K	S	S	E	L	P	R	A	H	S	B	I	P	G	R

© 1999-2004 by
Pierre G. Potvin
Department of
Chemistry
York University

Alphabetical list of names appearing in the puzzle:

Altman Barton Cram Curie Ernst Fukui Gilbert
Haber Hahn Herzberg Hoffmann Joliot Lee Lehn
Marcus Mulliken Olah Pauling Polanyi Prelog
Prigogine Seaborg Sharpless Tanaka Taube Werner
Woodward Zewail Ziegler

A Challenge?

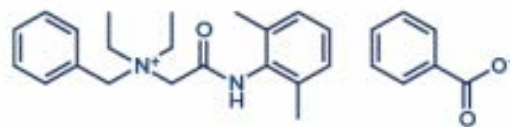
By: Stephanie Liu, Co-Editor

If you're at all connected to the internet, then you've heard of the latest bizarre-o challenge craze sweeping through this great country's adolescent population. A quick Google search will reveal a plethora of videos showing teens doing the Tide Pod Challenge, which entails biting into detergent pods and experiencing immediate regret at the risk of severe bodily harm. While yes, these convenient detergent pods may look like plump colorful packets of juicy forbidden fruit, they are, in fact, LAUNDRY DETERGENT, used for, you know, laundering your clothes. They contain a myriad of chemicals that will wreak havoc on your organs, but are great for getting that wine stain out of your favorite sweater.

The pods themselves are encased in a thin film of polyvinyl alcohol (PVA) polymer that is water soluble. This film encapsulates the liquid detergent within, which is often brightly colored and bursting at the seams, giving the appearance of some kind of gummy candy. Once in water, this film will dissolve, releasing the detergent into your next load of laundry (or your esophagus!). This is when the surfactant molecules get to work. Most detergents use ethoxylated alcohols or alkylbenzene sulfates, both of which fall under the umbrella of surfactants. These molecules consist of a hydrophobic end that binds to the grease and dirt in your clothes, and a hydrophilic end, that binds to the water in your washing machine, allowing that dirt and grease to be washed away from your clothes. These surfactants are particularly dangerous when ingested due to their ability to affect cell membrane permeability, which could potentially cause a lot of problems for living creatures. Furthermore, many detergent solutions are highly alkaline, which can cause severe skin irritation or chemical burns.

The majority of laundry detergent's cleaning powers come from surfactants, although some may contain other compounds as well. Some brands of detergent contain enzymes that will digest compounds that stains are composed of, allowing them to be cleaned that way. Others contain brighteners, which are responsible for keeping your whites whiter than white. These compounds absorb UV light and emit it as visible blue light, giving the appearance of brighter whites. This also explains why people who wash their clothes with Tide before hitting the club will often glow.

Teens have no real excuse for wanting to eat Tide pods, but others might not know better, and unfortunately the consumption of detergent pods has led to death in the past. According to some news sites, from 2012 to mid-2017, the consumption of detergent pods has led to the deaths of 8 people, most of whom were actually adults suffering from dementia, along with young children. To discourage the eating of laundry pods, companies have begun to add a compound called denatonium benzoate, the most bitter compound currently known to mankind, to the plastic films. All in all, eating Tide pods is going to be a highly, highly unpleasant experience, and, while I can't *tell* you what to do, I can *strongly* suggest that you don't.



Denatonium benzoate

References:

1. <http://www.compoundchem.com/2018/01/25/laundry-pods/>
2. <http://www.telegraph.co.uk/news/2018/01/13/warning-alarming-tide-pod-challenge-detergent-eating-youtube/>