October 10, 2016

WMW opens doors to undergrads

HYE JOON LEE
Page Editor

STEM can be isolating for women. Especially at Caltech, where the gender gap has historically been large, women can find themselves stranded in the middle of a male-dominated field. Though Caltech has recently spearheaded major efforts to increase female participation in the STEM fields, women still struggle with a variety of unique problems and issues. As women remain vastly underrepresented, creating spaces for open communication and mentorship amongst women in schools, workplaces, and universities is the best practice for keeping women on their paths to a STEM career. 13 years ago, the Women Mentoring Women (WMW) program was created to do just that. The graduate students and post-doctoral scholars who joined the program 13 years ago were often the only woman in their laboratory. In joining the program, first year graduate student women were paired with upper level graduate student women, and upper level graduate student women were paired with post-doctoral scholar women, and the pairs would get to know each other better throughout the year as they supported each other through their “academic, professional and personal development”. However, there is oftentimes no support network for undergraduate women. The road to a successful STEM career is winding and full of confusing possibilities – applications, internships, projects, research, et cetera. Thus, the WMW program is opening up mentorship opportunities to undergraduates for the first year in the program’s history. It serves as a network of undergrads, grads, postdocs and staff who can all help you find resources to answer your questions. First and second year undergrads will similarly be paired with upperclassmen students and upperclassmen with graduate students. Undergrad women will have a lot to gain from a more formalized mentorship. A mentor can develop into your go-to ally, and an ally that will always be an advocate for your success for an entire career. Navigating the STEM field with the help of someone who has similar past experiences can be a major advantage in terms of advice, mentorship, and networking. The WMW program also provides a coffee stipend to encourage the sharing of experiences, ideas and advice.

Applications for the WMW program is due on Sunday, October 16th. Go to https://diversitycenter.caltech.edu/women/mentoring for more information. Don’t forget to also check out other programs facilitated by the Diversity center include the Dish and Discuss and the monthly STEMinars!

News briefs from around the globe

A brief list of events from the past week, compiled by the editors

Colombian President donates Nobel earnings
$925,000 earned by Juan Manuel Santos for reaching peace agreement with FARC goes to victims of 52-year conflict [BBC]

Fundraiser earns money for blind can collector
$30,00 raised for J.B. Kipler, who supports granddaughters by dumpster diving [BBC]

U.S. economy creates jobs in September
156,000 new jobs created is slightly less than 180,000 average this year [BBC]

U.S. carriers drop Samsung Note 7 and replacements
4% drop in shares attributed to the Note 7’s tendency to catch fire [BBC]

Car bomb explodes in southeast Turkey
18 killed, 27 injured by bomb, Kurdistan Workers’ Party is blamed [TIME]

Passenger train derails in New York
29 hospitalized by wreck, no deaths reported [BBC]

Matthew slams North Carolina
17 killed in four states, thousands still in shelters after the post-tropical cyclone hit the east coast [CNN]

Research Award

This article is adapted from a story that was originally published online at caltech.edu.

Henry Lester, Bren Professor of Biology and Biological Engineering, has received a Transformative Research Award from the National Institutes of Health (NIH) as part of the NIH’s High-Risk, High-Reward Research (HRHR) program. The Transformative Research Award, established in 2009 and awarded this year to 12 scientists, supports “exceptionally innovative, unconventional, paradigm-shifting research projects that are inherently risky and untested,” according to the NIH press release.

Since he arrived in 1973, Lester has spent his entire professorial career at Caltech. His research now focuses on the actions of drugs on the ion channels, receptors, and transporters of “excitable cells” – cells such as neurons and muscle fibers that use electrical signals. Lester helped to pioneer “inside-out” neuropharmacology, which studies how the interaction of nicotine and nicotine receptors in an organelle called the endoplasmic reticulum leads to the addictive effects of nicotine, and in some cases to neuroprotective effects.

Lester Receives “High-Risk, High-Reward” Research Award

Caltech Media Relations

With this award, Lester will study the mechanisms by which certain psychiatric drugs exert their therapeutic effects, as well as how additional addictive drugs such as opioids work. He hypothesizes that these drugs also work “inside-out,” binding first to molecular targets within organelles in cells. He and his group aims to develop genetically encoded fluorescent biosensors to measure drugs within organelles.

Nicotine has served as a model for neuroscience and pharmacology ever since Columbus’s crew sampled tobacco,” says Lester. “Caltech continues to support our work on the hypothesis that insights from nicotine help to explain psychiatric and addictive drugs, and this grant provides both additional validation and much-needed support.”

Lester has more than 330 publications and nine US patents. He has served as chair of the Caltech faculty and as president of the Biophysical Society. He participates on the California Council for Science and Technology. This year, the HRHR Program, supported by the NIH’s Common Fund, awarded 88 grants in four categories: 12 Pioneer awards, 48 New Innovator awards, 12 Transformative Research awards, and 16 Early Independence awards.
The Caltech Y Column serves to inform students of upcoming events and volunteer opportunities. The list is compiled by Katherine Guo from information given by the Caltech Y and its student leaders.

The transportation is included. For more info and to RSVP email Sherwood Richers at srichers@caltech.edu. Eligible for Federal Work Study.

3. The Caltech Y Social Activism Speaker Series (SASS) presents Labor Market and Wage Floor: A Minimum Wage Policy Panel Discussion

Wednesday | October 12th | 12:00-1:30 PM | Library

Recently, California and New York both passed bills setting the state minimum wage to $15/hr. The city of Pasadena also passed similar legislation locally. Interestingly, differing opinions on the issue of raising minimum wage do not necessarily follow party lines. Prominent Republicans and Democrats fall on both sides of the argument. Please join us for lunch and an in-depth panel discussion featuring: Andy Wilson, Pasadena City Council Member; Daniel Flaming, Economic Roundtable President; Abel Ramirez, CEO of El Portal and former GM of Caltech’s Athenaeanum; and Pablo Alvarado, National Day Laborer Organizing Network Executive Director. Made possible with funding from the George Housner Fund.

Lunch will be served.

Spaces are limited (Preference given to those who can stay for the entire talk). RSVP Required: https://goo.gl/forms/2nQogwchGwfyuxd12

4. Union Station Adult Center

Saturday | October 15th | 9:00 - 1:00 PM | Pasadena

Prepare and serve dinner to the residents at Union Station Adult Center in Pasadena. Food and materials are provided. The Adult Center provides shelter, meals and supportive services to men, women and homeless individuals. For more info and RSVP email achen@caltech.edu.

Beyond the Y

1. SEPAC – Science and Engineering Policy at Caltech presents: A Discussion with Dr. Elizabeth Bodine-Baron of RAND Corporation

Friday | October 14th | 9:00 - 10:00 AM | Gates Annex Library

Join SEPAC (Science and Engineering Policy at Caltech) for a discussion with Dr. Elizabeth Bodine-Baron of RAND Corporation.

Elizabeth Bodine-Baron is an engineer at the RAND Corporation specializing in complex networks and systems. Her research interests include network analysis and modeling for both domestic and national security issues. Recent work has included improving the Air Force’s acquisition policy related to cybersecurity, studying the impact of cyber attacks on defense systems, and social network analysis for national security, intelligence, and health applications. She has recently led several projects involving social media for policy analysis, from Twitter data to identify ISIS support and opposition networks to developing best practices for social media analysis.

2. American Red Cross

The American Red Cross is holding a Blood Drive on the following days at Caltech:

Monday, October 10th (8:00 AM - 8:00 PM)
Wednesday, October 12th (12:00 - 6:00 PM)

The Blood Mobile will be parked by the Chandler Café. To schedule an appointment log on to www.redcrossblood.org enter sponsor code: CALTECH
The Engelmann Oak

RADU UZGIL
Contributing Writer

The juxtaposition of ancient and modern architectures sharing the same city skyline, of past and present generations sharing a row on the Gold Line, of, in general, the simultaneity of the “old” and the “new”... can, at times, produce a jarring, overtly ironic effect that robs a scene of any lasting meaning. The Engelmann Oak, however, in front of Dahney Hall and behind Hale’s bust on Caltech’s campus blends seamlessly with the young crop of roses framing Millikan pond and the bright-colored backpacks passing by. Rusty iron pillars cradle the weight of four hundred years without begging anyone’s attention.

Arms outstretched, the oak wordlessly welcomes, consoles, embraces, cheers on the quad’s more transient occupants, who bob rhythmically with the academic cycle, or, like me, flicker in and flicker out of view stochastically. To an assembly of foliage — a canopy of unblinking eyes — the passage of centuries may have rendered it, in fact, into a random walk, somehow equalizing in this process Catholic missionaries with Math 1A students, pinching rancheros with lunching Tchoers, unamed earth with fenced-off soil. Undoubtedly, this steadfast gaze has also merited a view of rhythms invisible to other sets of (blinking) eyes. On so many of my walks through the quad — and on at least one occasion, a memoir-long standing meditation — I and perhaps others, unwittingly or with some degree of focused intent, have sought from the oak this perceptive, which the humble and generous professor never denied.

My reverence for its longevity, however, nearly imparted an aura of permanence upon the oak, or more accurately, succeeded in imparting an aura of permanence until our roles suddenly reversed and the aura shattered, dropping somewhere in a bed of mulch. The tree is now fading into transience as I stand watching across Millikan pond. I desperately search for a spot of green amid the brownish muck of hundreds of lowered eyelids. Instead, the Engelmann offers, in its characteristic silence, a final lesson in impermanence, which, emanating from the heart of an institution where the “old” is forever discarded in pursuit of the “new,” echoes loudly off Hale’s oxidizing head.

LORI DAFIOSE
Caltech Media Relations

This article is adapted from a story that was originally published online at caltech.edu.

Since 2008, the Caltech–City of Hope Biomedical Research Initiative has brought together resources and expertise from the two institutions. Funded by Caltech, City of Hope, and private donors, the initiative provides seed grants to accelerate the development of basic scientific research and its translation into biomedical applications. On September 27, 2016, researchers, doctors, donors, and faculty gathered at the Argyros Auditorium at City of Hope to celebrate this partnership and hear about some of the latest discoveries to come from the collaboration.

“When institutions like ours [are] dedicated to a pursuit of knowledge, and to the practical application of that knowledge to the benefit of patients and families around the world, we can do profound things together,” said Robert Stone, president and chief executive officer of City of Hope, in his opening remarks.

“The partnership with City of Hope is very special. It’s one that’s deep and can have profound impact,” said Caltech president Thomas Rosenbaum, the Sonia and William Davidson Presidential Chair and professor of physics. “Contributing to the improvement of the human condition is something that a biologist or a chemist or a physicist or an engineer at the bench thinks about when they’re doing their experiments. If they find something that they can grab onto, and they have a partner who knows how to translate that, then the combination is formidable and will improve people’s lives for generations to come.”

The symposium featured speakers from two collaborations made possible by the 2014 round of funding.

Partners in innovation

Perfecting Personalized Therapy

Viviana Gradinaru; assistant professor of biology and Heritage Principal Investigator

Mei Kong; associate professor in the Department of Cancer Biology at the Beckman Research Institute of City of Hope

Cancerous cells are characterized by their rapid growth, and they need the nutrient glutamine to sustain this growth and survive. However, cancer cells that are buried in the center of tumors with very little access to nutrients are actually extremely difficult to kill. Kong theorized that, instead of starving in a low-glutamine environment, these core cells were actually mutating into “super-cells” with drug resistance. She proposed that glutamine plays a central role in gene regulation and that the lack of glutamine leads to more spontaneous mutations, and thus drug-resistant cancer cells.

Kong teamed up with Caltech assistant professor Viviana Gradinaru to find a way to see the distribution of glutamine molecules throughout a tumor and to see if decreased glutamine levels change gene regulation.

Gradinaru had previously developed a technique to render opaque tissues, such as the brain, completely transparent (a process called clearing) while chemically labeling particular cells in order to create 3-D models of organs and bones. By applying this clearing technique to melanoma tumor samples, the team was able to show that low-glutamine environments did indeed lead to gene deregulation, which leads to drug resistance.

Your Future is Calling

Mory Gharib: director, Graduate Aerospace Laboratories, Hans W. Liepmann Professor of Aeronautics and Bioinspired Engineering

Davey Wargo: associate professor, Department of Population Sciences; director, Childhood Cancer Survivorship Program, Beckman Research Institute of City of Hope

Although the survival rates for patients with childhood cancer are increasing (be-cause of improvements in survival), people who have had childhood cancer unfortunately are at greater risk for health complications later in life, such as heart failure. Former cancer patients must undergo regular screenings and monitoring for these additional health problems, which can be expensive and time-consuming.

One important measure of heart health is the so-called ejection fraction, the fraction of blood that is ejected from the heart with each heartbeat. A healthy heart will have an ejection fraction around 64 percent; too low or too high of an ejection fraction indicates health problems. Gharib, who is a faculty member in Caltech’s department of medical engineering within the Division of Engineering and Applied Science, wanted to find a way to measure the ejection fraction using the theory that the human body can be modeled as a “wave field” — with each pump of blood, the heart sends vibrations throughout the body that can be modeled as oscillating waves.

When the heart is pumping, the aortic valve (the valve that blood passes through on its way to the rest of the body) is either open or closed. When it is closed, the heart is sealed from the rest of the body (a “decoupled system”) and when the aortic valve is open, the heart and the body are one, “coupled” system. Gharib used mathematical models of these two systems to calculate a so-called intrinsic frequency characterizing each, which he then used to compute the ejection fraction.

The next step was to develop a way to measure these intrinsic frequencies in a noninvasive way that patients could do on their own in order to check their general heart health. Gharib, Armenian, and their groups designed a small piece of hardware that can connect to an iPhone and calculate a patient’s ejection fraction — for less than $8.

The device, called Vivio, gives comparable results to a cardiac magnetic resonance imaging, the gold standard in the medical industry for measuring heart health.

Both Gradinaru and Gharib’s projects were part of the 2014 round of funding, seven biomedical research initiative teams, including Gharib’s and teams led by Mikhail Shapiro, Alexei Aravin, Joel Burdick, Andre Hoeh, Mitch Gutman, and Linda Hsieh-Wilson, received support in the 2016 round of funding.
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Feist records sixth double figure save game

CLAREMONT, Calif. (Oct. 8, 2016) – Senior J.D. Feist racked up a seemingly insurmountable double figure save game as Caltech men’s soccer held Claremont-Mudd-Scripps Colleges scoreless in the first half before falling, 3-0, on the road Monday night.

Feist single-handedly kept CMS off the board in the first half, stopping eight successive shots while the Caltech offense generated a single shot at the other end, which sophomore Tristan Née put on frame to force a save. Feist made a ninth straight save before CMS popped in a pair of close-range goals in a two-minute span from the 66th-68th minutes. The Stags added an insurance strike in the 77th minute.

The Beavers’ second game began entirely different, with McKendree surging ahead 4-1 after the first quarter and building up a seemingly insurmountable 11-5 lead late in the third quarter. With 3:39 left on the clock, Head Coach Jon Bonafede called his final timeout of the game and it proved a masterstroke. Ross netted on the Beavers’ next two possessions and Bradley fired home a buzzer-beater to make it three straight, halving the deficit at the last break.

McKendree settled down to hold back the furious rally for the first couple minutes of the fourth quarter, but senior Connor Lee broke through again with 5:45 on the clock to pull Caltech within two. The Bears briefly extended the margin back to three, but the Caltech surge could not be stopped as the Bears scored four more goals, two steals, two field blocks and one assist while Ross notched another hat trick and Lee netted twice. Justice, Lee, Ross and sophomore Eshan Govil all assisted on a pair of goals apiece while Gilani totaled 14 saves.

Water polo nabs first consecutive NCAA wins in 30 years

CLAREMONT, Calif. (Oct. 5, 2016) – Senior J.D. Feist racked up his sixth game of double-figure saves as Caltech men’s water polo nabs first consecutive NCAA wins in 30 years with wins against Penn (2016) and Pomona-Pitzer (2016).

The match began slowly for both teams as four of the first five combined points were scored on errors. The foes traded points throughout the set, with the Beavers finally taking their first lead midway through at 13-12. Caltech extended the lead to three before a three-point Mills run immediately erased the margin, but the Beavers responded with six of the next eight points to surge ahead by four at 22-19. With their backs against the wall, the Cyclones clawed back to a 23-23 tie on a kill, two errors and another six unanswered points to open the third. Caltech extended the margin throughout the set with Mills summoning one final rally to fight off three match points before Li closed it out with her 18th kill of the night.

The Beavers started the next set with another three attacking errors in the first five points to trail 4-1, but would finally find their stride to hit above .500 the rest of the way. Feeding off the crowd’s energy, Caltech went on to score six straight points to take the lead at 7-4 and never looked back, going on to dominate the set, 25-12. Fueled by the momentum and with their first 2-0 match lead of the season, the Beavers scored another six unanswered points to open the third. Caltech extended the margin throughout the set, with Mills and Justice scoring a pair of goals apiece while Gilani totaled 14 saves.

The volleyball team performed a rain dance for the drought in California.

-http://gocaltech.com
ASCIT Minutes
Meetings are every week in SAC 13

ASCIT Board of Directors Meeting
Minutes for 5 October 2016. Taken by Alice Zhai.
Officers Present: Tim Liu, Sakthi Vetrivel, Kalyn Chang, Alice Zhai
Call to Order: 12:07 pm

Officer’s Reports:
V.P. of Academic Affairs (ARC Chair: Tim):
● Article written in the Tech about changes made by the ARC
● Most option chairs found for student faculty meeting
● Faculty board meeting next week

V.P. of Non-Academic Affairs (IHC Chair: Bobby):
● Absent

Director of Operations (Sakthi):
● Need to set up meeting for club funding
● Club Fair is Wednesday, October 5th

Treasurer (Kalyn):
● Reconsider getting bagels and donuts from CDS

Social Director (Robin):
● Absent

Secretary (Alice):
● Will set up an agenda for meeting with Joe Shepherd on Friday, October 7th

Election for ASCIT president is on October 10th.

If anyone has any questions or concerns about a section of the minutes please email the appropriate officer. We are happy to answer any questions.

Meeting Adjourned: 12:20 pm

JOIN THE CALIFORNIA TECH STAFF!
Looking for something exciting to get involved in this new year?
We are looking for more contributors!

We accept reviews, opinion pieces, research, news stories, comics and more!

Email tech@caltech.edu with questions.
KATHERINE GUO
Editor-in-Chief

Oftentimes, when I nag my friends with invasive questions about their lifestyles, like whether or not they floss, I am disappointed. This because they usually say “no”, followed by “we get it, you floss regularly.” And I say “Actually, I floss every day.” Anyway, the point is I think everyone could use a reminder that flossing every day is incredibly good for your teeth, and it doesn’t even take that long, and no, Jimmy Hamilton, using a Waterpik is not enough, despite what the advertisements say.

The most common complaint I hear about flossing is that it hurts. Well, the reason it hurts is because your gums are crying for help because your teeth are covered in bacterial plaque, especially in the nooks and crannies that you don’t get with brushing. If you let it sit it’ll become tartar, which is a hard yellow crust. Basically, letting plaque harden and spread in the aforementioned nooks and crannies between your teeth and between the tooth and gum makes your gums puffy and sensitive, gives you bad breath, and at worst, you’ll get gum disease and your teeth will fall out.

How to make flossing more fun? Well, first of all, it’s an easy way to procrastinate for another two-ish minutes. Another way is to not use cheap floss that is super thick and hurts you. I personally prefer “Oral-B Glide Pro-Health Clinical Protection...Floss”, which now I realize sounds a bit off. Besides that, it’s a good floss that is thin and ribbon-like so it doesn’t tear your mouth apart. If you really don’t want to use both of your hands, you can buy a pack of those flossers that looks like a claw with a piece of floss strung through. I know that this isn’t really making it more fun, but I promise that if you floss consistently for even two weeks, any pain or bleeding will reduce dramatically or even go away.

If you have a permanent retainer bolting your bottom front teeth together, you can’t really floss those normally. But wait! You can use a floss threader to weave the floss under the retainer wire and get at them! However, it is at this point that I get lazy, and I admit I don’t really like to do this because it’s a lot more of a hassle, but I do really want to have teeth when I’m senile. At least I’ll have that going for me.

Honestly, the best part of flossing is how clean and pure your teeth feel afterward. It’s like a juice cleanse for just your teeth, and it only takes a minute or two. You truly do not realize how much gunk you have between your teeth until you floss it out. Your breath will be better, and your teeth will be whiter, your father will come back into your life and want to be a family again...flossing is pretty great.

Crossword

Across

Down

THE CALIFORNIA TECH
OPINION
OCTOBER 10, 2016 7
Katherine rants: why flossing matters
Familial Relations

Slava, Nina, Lazarina

...and his lesser-known, inbred cousin:

MICKEY

MOUSE

RICKY

RAT

Answers to current crossword (pg 7)

Monday Punday

This picture represents a common phrase, title, or person.

Think you know the answer? Take a guess at monadaypunday.com/159

The California Tech
Caltech 40-58
Pasadena, CA 91125