Grad students win SISCA for global ideas

The Dow Sustainability Innovation Student Challenge Award, a program sponsored jointly by Dow Chemical and the California Institute of Technology, has announced the 2015 competition winners. Caltech graduate student Prakhar Mehrotra took home the $20,000 grand prize for his idea to build solar-powered storage units for food and crops in developing countries such as India. The “Micro Cold Storage” system would allow farmers to store their produce in an area near their fields in order to maximize the time between when a farmer can harvest their product and when they have to sell it.

Mehrotra explained that “India is a very fertile land...but there is no place to store the crops,” primarily potatoes. In India, many intermediary cold storage facilities are owned by monopolies that charge exorbitant prices, which are unaffordable for many farmers. This leads to widespread crop loss where humanitarian places such as Africa and places such as Africa and China, Mexico, Saudia Arabia, the Netherlands, UK, and Brazil and US universities Caltech, MIT, UC Berkeley, Northwestern, Penn State, Tufts, University of Michigan and University of Minnesota. Participating students must meet Dow’s rigorous criteria and final projects are judged through a peer review process at the school level. Entries may be submitted by both individual graduate students and teams. More information about the program can be found online at www.dow.com/sustainability/studentchallenge.

Mehrotra, “DOW has been in India, and DOW has visited India, so they understand the problem.” Currently, Mehrotra is working on the project part-time while finishing his PhD thesis in aeronautics. Runner-up and $5,000 prize winner Kangwoo Cho, another graduate student, studied wastewater systems that run on solar power. Cho won for his Photovoltaic-Powered Wastewater Electrolysis Cell which starts from the conventional electrolysis for water splitting to oxygen and hydrogen with employing the company’s 2015 Sustainability Goals, which include: Sustainable Chemistry, Breakthroughs to World Challenges, Addressing Climate Change, Energy Efficiency & Conservation, Product Safety Leadership, Contributing to Community Success, and Local Protection of Human Health & the Environment. Partner universities are picked by Dow for their efforts to address energy, climate change, sustainability, and food, water, housing, and human health concerns. This includes international schools in China, Mexico, Saudia Arabia, the Netherlands, UK, and Brazil and US universities Caltech, MIT, UC Berkeley, Northwestern, Penn State, Tufts, University of Michigan and University of Minnesota. Participating students must meet Dow’s rigorous criteria and final projects are judged through a peer review process at the school level. Entries may be submitted by both individual graduate students and teams. More information about the program can be found online at www.dow.com/sustainability/studentchallenge.

Mehrotra plans for the storage units to measure 6x8x12 feet, which will provide enough space for a small family farm. Additionally, his group removed the battery and water (both of which are found in traditional refrigeration systems and raise the product cost) in favor of new technology that they are currently patenting. When asked why his team chose solar power he responded, “it could be wind also...But India is a solar rich country...[And fuels such as kerosene are much more expensive.”

The cold storage units are not limited to crop usage. Mehrotra envisions the refrigeration devices used in places such as Africa where humanitarian workers need to keep vaccines at cool temperatures. Mehrotra and his team are excited for DOW and Caltech’s sponsorship of their project. According to Mehrotra, “DOW has been in India, and DOW has visited India, so they understand the problem.” Currently, Mehrotra is working on the project part-time while finishing his PhD thesis in aeronautics.

In the near future Cho plans to have a working community toilet prototype to be tested on Caltech’s campus with eventual deployment in Africa and India. Cho’s work is closely tied to Caltech Environmental Science and Engineering Professor Michael Hoffmann and he will continue to work on developing a simplified procedure for the BiOx/TiO2 electrode, which shows a higher activity for chlorine evolution and stability. Dow Chemical created the program in 2009 with 17 partner universities to reward students that conceive novel answers to the social, economic, and environmental challenges faced in our world. The winning solutions coordinate with the company’s 2015 Sustainability Goals, which include: Sustainable Chemistry, Breakthroughs to World Challenges, Addressing Climate Change, Energy Efficiency & Conservation, Product Safety Leadership, Contributing to Community Success, and Local Protection of Human Health & the Environment.
Food with Mannion!

Do you like eating food? How about free food at nice restaurants? Ever want to tell the world exactly what you think of said food? The Tech will be beginning a new column to chronicle the foodie experiences of new writers every other week...The Catch: They'll be going head-to-head with Tom Mannion who will be reviewing the same restaurant. If you have ever thought you were more of a gourmet than our resident master chef, now's your chance to prove it!

Email us for a spot on the list at tech@caltech.edu

ASCIT Minutes

Minutes for November 29, 2012. Taken by Allika Walvekar

Officers present: Diego Caporale, Zach Rivkin and Matt Fu in lieu of Christian Rivas, Pushpa Neppala, Mario Zubia, Michelle Tang, Allika Walvekar, Puikei Cheng

Call to Order: 8:35 pm

DevTeam: Eric Pelz updated the BoD on the status of DevTeam. The BoD will be conducting interviews at the beginning of second term for anyone who would like to participate in DevTeam.

President’s Report (Diego): RA recruitment will start within the next 1-2 weeks. The House Presidents will be disseminating cards that students can pass out to their favorite grad students to encourage them to apply to be an RA. The ASCIT Meet and Greet will happen Sunday 12/2 at 1:30pm in Tom Mannion’s house. The BoD will be re-examining the BoC bylaws, and the new vote will be a line item vote sometime before midterms next term.

V.P. of Academic Affairs (ARC Chair: Pushpa): The next Student Faculty Lunch will be on Dec. 6th. Joel Tropp is the November Professor of the Month. Pushpa and Avin met with Ray Gonzalez to plan the Honor Code survey that will be released in January. The option committees have started working on their surveys for the 2013 SFC. The ARC will be hiring someone new to run the course capturing program.

V.P. of Non-Academic Affairs (IHC Chair: Zach Rivkin, Matt Fu in lieu of Christian Rivas): The House presidents will be assisting with student involvement for the RA hiring process.

Director of Operations (Mario): Mario has updated all the clubs that have been approved by the Club Steering Committee with the amount of funding and storage space they have been granted. Mario is working on ensuring a timely delivery of last year’s yearbooks.

Treasurer (Puikei): Once Puikei receives the finalized list of approved clubs. she will update the information in the Registrar so that clubs can access their new funding.

Social Director (Michelle): Ricketts is planning a Holiday Party on 12/7. Michelle is planning an end of the year event at Coffee House’s last night of term (12/6). The event will be holiday themed and will feature Santa, sleigh rides, a fire pit for s’mores, and lots of giveaways.

Secretary (Allika): Working on a design for ASCIT Thank You Cards. With the help of DevTeam, Allika re-launched the announcements page on donut to post email announcements.

Meeting Adjourned: 9:36pm
On Friday night, I followed Abraham Lincoln as he fought across party lines to pass the Thirteenth Amendment. Though the brilliant acting, direction, and script are not to be denied, I was mostly blown away by the attention to detail in the era-specific costumes. The coloring of the film made it feel antique as well. You might have heard about method acting – techniques that actors use off-stage to immerse themselves in their role. Well, don’t know if this is what Daniel Day-Lewis did, but there was not even a hint of the man under the clothing. The film seemed out of character. Seriously, only Lincoln himself could have done a better job. The film gives a positive portrayal of Lincoln, but it does not shrink from showing how Lincoln wrestles with his domestic life – his oldest son, played by Joseph Gordon-Levitt, does not shrink from showing how he can be a struggle. In the meantime, definitely give it a watch! It’s my card that I went to see two movies in a row at an Arclight Cinemas member. I can’t quite name it, but I can’t quite name it. I was standing straight and talking. Second, there is something about the way Techers and act with their surroundings that sets them apart from the rest. I can’t quite name it, but it’s very noticeable. One of the things that I noticed in the film was how Victoria’s dressing. This is one of the reasons why she seemed out of character. Seriously, only Victoria herself could have done a better job. The film gives a positive portrayal of Victoria, but it doesn’t shrink from showing how Victoria wrestles with her domestic life – her husband, much, much Eliphas, doesn’t notice. She’s been raised to have a clean face. Skin is like a canvas for a painting, so getting a good facial soap and washing twice a day is a must. So, in order to apply any makeup, a girl should apply a primer to her face. Just like paint primer, it prepares the face for makeup and keeps the makeup in place much longer. Powders go on much smoother and look juicier and the skin looks fresher. Primer can be worn by itself, but under makeup, it works miracles. Foundation isn’t really necessary if a girl has good skin and should be used very carefully. It is actually one of the first things a guy notices if it is not done well. If using foundation, it must blend into the neckline to avoid the printer effect of a pale face on a darker body. Fortunately, I was spared the phase when first girls start trying to make up and end up looking like ghosts under the flicker of the 3-D illusion. This is what happened in middle school. So, to make sure you don’t do that...I lied on that. The girls learned that first and foremost, a girl must have a clean face. Skin is like a canvas for a painting, so getting a good facial soap and washing twice a day is a must. Next, after applying any makeup, a girl should apply a primer to her face. Just like paint primer, it prepares the face for makeup and keeps the makeup in place much longer. Powders go on much smoother and look juicier and the skin looks fresher. Primer can be worn by itself, but under makeup, it works miracles. Foundation isn’t really necessary if a girl has good skin and should be used very carefully. It is actually one of the first things a guy notices if it is not done well. If using foundation, it must blend into the neckline to avoid the printer effect of a pale face on a darker body. Fortunately, I was spared the phase when girls first start trying to make up and end up looking like ghosts under the flicker of the 3-D illusion. This is what happened in middle school. So, to make sure you don’t do that...(I lied on that). The girls learned that first and foremost, a girl must have a clean face. \[...overly warm winter clothing has not been necessary for physical comfort, but has served as a symbol of this cozy season. \]
A brief sit-down with Professor Niles Pierce

**JAMES CHANG**  
Contributing Writer

California Tech: What was life like at Princeton?

Niles Pierce: Life was extremely busy as an undergrad. I know Caltech undergrads feel like they've got the fire-hose situation, and it was very much like that for me at Princeton too. Engineers have to take a heavier course load than the other students, and it was very much a problem set, exam, problem set, exam type of lifestyle. It was a very intense experience. It's quite a bit different from Caltech though. The student body is much more diverse in its interests, so by comparison a much smaller fraction of people are working in technical fields. Sleep deprived or not, my roommates and I had a great time. We were good at finding the humor in our situations.

CT: What do you do in your spare time?

NP: I like to play sports with my daughter Clara and wife Gillian. Clara is eight years old. We play baseball together, and as Clara likes to say, she's "old school". She wants to use a wood bat, and she gets very upset with her father if he tries to get her to use a lighter aluminum bat. Her stated career goal is to be the next Jackie Robinson - she wants to be the first female player in the major leagues. We also play soccer together. I serve as her soccer coach and also as assistant coach for her baseball team. We play all kinds of sports together in the park with friends and neighbors.

CT: Tell me about your soccer career.

NP: I'm a serious soccer player. I've played competitively most of my life. I grew up in Southern California, and when I started to learn soccer as a five-year-old, that was just about the time that it started to be available as a sport in my hometown. I played for the Christ Church college 1st XI in Oxford while I was a grad student over there, and we won the Oxford University Cup. The Dean of the College hosted black tie dinners to celebrate those victories. These days, I'm playing in a Pasadena league. For years, I've also played one game a year for Ruddock when they play Fleming. So far, we've always lost.

CT: What kind of soccer player are you and what is your weakness?

NP: I'm a striker. If you're a striker, your job is to score goals. The success of your contribution is largely based on brief moments that punctuate the overall game. The thing that I always try to do is to be calm in that moment but when there is opportunity to score a goal and to remember that the goal keeper is more nervous and less calm. I try to make sure that's the case. It's something that is very hard for soccer players to do at any level. Most players can't be calm in that moment and make a good decision and take the shot that's needed. It's an ongoing mental challenge. Last night I played in a game where I didn't score and we lost. I woke up in the middle of the night frustrated with moments or decisions where I could have done something slightly differently and possibly scored. It's a never-ending cycle of dissatisfaction and exultation. The day after a game, I can be standing in line at Peet's - legs sore, feeling beat up, but if I scored a couple of goals the night before and my team won, it just feels so good.

I'll tell you what my weakness is. I have never, in a competitive game, ever scored a goal with my head. I joke with my teammates. If I head the ball, that's one less paper I'll publish in my career. I really try as a player to put myself in a position where I will not be expected to head the ball. Most strikers score a lot of goals with their head, but my talent is different. I'm good at making sure I never have the opportunity.

CT: Why did you change fields?

NP: One thing that is unusual about me is that I've switched fields multiple times in my career, and I don't promise not to do it again. It's liberating in life to realize that you're not just headed down one irreversible road. Basically, you're not just headed down one kind of scientific career.

It certainly is risky to switch fields when the tenure process is involved, but mostly I think you just have to be willing to ask questions and to not be embarrassed to tackle something new and unfamiliar. It's disorienting to be used to having mastery in one area and then to have to not only learn a new set of ideas but to get to know a new community of researchers. For me, it's been important to follow research interests across fields. I started as a mechanical and aerospace engineer at Princeton, then a minor in applied mathematics. For my senior thesis, I worked in computational fluid dynamics, and I decided to do my doctoral research in applied mathematics working on computational fluid dynamics. Later, before starting my independent research career, I decided to shift fields and apply computational mathematics to the field of biology.

At the time, this was not a traditional goal for applied mathematicians. I decided to take the plunge. In the fall of 1998, Gillian and I got married, moved from Oxford to Pasadena, and I switched fields by starting as a postdoc in the Biology Division at Caltech.

I'm open to continuing to shift fields over time, but that will be driven by research questions.
**Bike Lab Announcements**

**Caltech BikeLab Christmas Light Ride on December 11!**

The Caltech BikeLab is leading a bike ride to go see the Christmas lights around the neighborhoods near Caltech and Pasadena. We’ll meet at the Bike Lab (see map), head north to Christmas Tree Lane in Altadena, with very impressive Christmas displays, and other displays along Altadena Dr and Allen Ave.

Following that, we’ll head back to Caltech, where we will have cider and hot chocolate.

Please bring your bike lights and a helmet since we’ll be doing our riding after dark! Everyone is welcome. Join us!

Questions? Contact us at bikeshop@caltech.edu

**Pasadena Fold ’N’ Go Bike Subsidy Program**

The City of Pasadena and Metro developed a new and exciting folding bike subsidy program “FoldnGo Pasadena,” which provides generous price discounts to transit riders to purchase a folding bike to ride to bus and/or rail stops in Pasadena.

If you live, work, or study in Pasadena, you can get $220 off the price of a folding bike: http://foldngobike.com/go-learn/

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$100,000

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Today’s Puzzle: Crossword

Across
1. Destiny
5. Female horse
9. Molar
14. Gemstone
15. Highly excited
16. Relating to sound
17. Part of the neck
18. Deep loud noise
19. Move furtively
20. Three-legged stand
22. Skilled in movement
24. Change location
26. Cut in three
31. Religious doctrine
33. Relating to the eye
34. Subsequently
37. Become known
39. Animal foot
40. Formal association
41. Spanish title
42. Chief
45. Branch of knowledge
47. Agreement
48. Specific anesthetic
50. Flow of water in the same direction as the wind
52. Worked hard
55. Blush shade of green
57. Shrub
59. Length of sawn wood
63. Lather
65. Small restaurant
66. Spooky
67. Boundary
68. Notion
69. Entice
70. Facial expression
71. Limited period of time

Down
1. Typeface
2. Separate
3. Nocturnal ungulate
4. Raise
5. Arboreal mustelid
6. In the past
7. Highway
8. White heron
9. Plan of action
10. Belonging to us
11. Lyric poem
12. Draw
13. Jump lightly
14. Relating to sound
15. Highly excited
16. Relating to sound
17. Part of the neck
18. Deep loud noise
19. Move furtively
20. Three-legged stand
22. Skilled in movement
24. Change location
26. Cut in three
31. Religious doctrine
33. Relating to the eye
34. Subsequently
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71. Limited period of time

Caltech Public Events is now hiring student ushers.
$15 per hour to work concerts, performances, lectures, films and parties.
No experience needed, no hard labor, flexible schedules.
*Requirements: Caltech student, Positive attitude, Friendly personality

To apply email Adam Jacobo (ajacobo@caltech.edu)
or call (626)395-5907

For info on Caltech Public Events visit: www.caltech.edu/content/public-events
Clockwise from top left. Dat face; Freshman KC Enzie jumps over everybody. He did this several times; Everybody looks surprised in this picture. Actually, Hogue looks more like he’s completing a double take; I like this picture because Esther Du gets fouled and the Redlands player’s all like, “It wasn’t me...don’t look at me...I’m all the way over here and she’s all the way over beyond yonder; Either she’s waving or has an urgent question. Both could probably wait until after the game; ALL HAIL THE MAGIC FLOATING BALL! HAIL!

These pictures were taken at the Caltech men’s and women’s basketball games vs Redlands. The men lost 106-74 and the women lost 70-49. Say, if you want to learn more about the men’s game, Vishnu Manoranjan, Mandy Gamble, and I put together a highlight reel. It’s available on youtube. So, yeah. Do that. Or not, either way. I won’t be upset. Just a little bit hurt.

-Amol Kamat and Vishnu Manoranjan
Acquired Taste

by Dr. Z

For more photos, videos, and archives of previous issues, check out the Tech website!

tech.caltech.edu