

BRINGING ASHDOWN

January 2016

In this issue

Upcoming Events
Guide to Enjoying Winter
Architecture @ Chicago
Research on Biomass Energy

UPCOMING EVENTS:

Sunday, 1/24 Fourth Floor Welcome Back Dinner

Location: 4th Floor Kitchen

For residents of the 4th floor of Ashdown, dinner from India Palace will be provided at 7pm.

Sunday, 1/31: Ashdown Casino Night

Location: Hulsizer Room 7pm

Join us for Ashdown's annual Casino Night and play Blackjack, Craps, Roulette & Baccarat with your friends! At the end of the night you can cash in your chips for raffle tickets and win prizes!

Sunday 2/7: Sid-Pac Research Art Night

Location: Sidney Pacific 7-9 PM

Interact and creatively explain your research in a fun but formal setting— a combination research image/art exhibition and wine/chocolate night with plenty of prizes for participants. Check Ashdown emails for more details on submissions.

Every Thursday: Coffee Hour, 9pm

Location: Hulsizer Room

Enjoy coffee, fruit, salad, cheese, and desserts with Ashdown residents. Volunteers welcome.

ANNOUNCEMENT:

The Ashdown Communities Committee had allocated a Fun Fund that can be used by all residents to self-organize small outings or activities.

Submit your proposal at <http://goo.gl/forms/ciykueqv1x>

Good examples could be going for a movie, laser tag, ice-skating, paintball, etc.

The current rules regarding this fund are the following:

- 1) We will subsidize up to \$150/event or \$15/person.
- 2) If your event is approved, you must advertise it to the entire Ashdown community
- 3) You must submit the proposal for the event at least 5 days in advance to allow at least 3 days for publicity.
- 4) Proposals are awarded on a rolling basis

If you have any questions, please email Malvika Verma at mverma@mit.edu

Hi Ashdowners!

Whether you are reading this edition from the cozy walls of Ashdown House or digitally around the world during your IAP travels, we hope you are all enjoying your January term!

The first IAP dates back to 1971 as a four-week-long inter-semester term to give students the opportunity to explore activities outside of their academic routine. Some students choose to enroll in one of the hundreds of optional classes, lectures, demonstrations and activities offered by MIT. Others will sign up for externships, pursue independent projects, or turn the two-week winter break into a six-week vacation.

For the next edition of the Newsletter, we would like to highlight your IAP adventures by holding a competition. Whether you spent IAP designing an independent project, working on an important cause, or traveling the world, submit your 1-2 page write-up to ashdown-comms@mit.edu (bonus points if you include photos). If your submission is published in the newsletter, we will send you a \$50 gift card for your contribution.

In this month's edition of the newsletter, we are featuring three original pieces from fellow Ashdowners, including Jane Chui's tips for surviving winter in Boston, Alice Kao's trip to the Chicago Architecture Biennale and Kevin Kung's research on biomass energy improvements. Enjoy!

Your Communications Officers,
Tram Nguyen & Cody Karcher





A TIME TO BE **GRATEFUL**

The tables were set and the food was aplenty when 50+ Ashdowners gathered in the Hulsizer room to celebrate Thanksgiving. This year, students found much to be grateful for. Whether we were looking forward to the end of Fall semester, spending time with friends and classmates, or appreciating the mild winter weather, the residents celebrated by feasting on endless sides of mashed potatoes, corn, and desserts.

In December, Ashdown hosted a holiday potluck and a special coffee hour with plenty of gingerbread cookies, pastries, and eggnog. Residents designed their own holiday cards with provided stationary materials and craft paper. These events are a reminder that here at Ashdown, we are a community that comes together during these special times to partake in full-hearted affairs throughout the year.

We asked, you answered:

What are your plans for the holidays?

“For IAP, I’m doing a **department externship** at an architecture firm in **San Francisco**. I’m glad I can escape the snow for one more month!” –*Alice Kao*

“For the holidays, I went home to Germany to visit family and hit the **Swiss Alps** slopes with friends. For IAP, I will be **in Israel working on an Action Learning project** for Sloan regarding maritime data analytics.” – *Marius Pfahler*

“This holiday, I plan to visit my family and friends in New Jersey. When I get back in January, I will be spending IAP **conducting the usual research**. I hope to make a lot of progress before classes start up again, but, of course, research may have other plans.” ---*Sakul Ratanaalert*

“During IAP, I will mostly spend time doing research. But I will hope to also enjoy some of the many **cool activities that go on during January**. I’ve heard great things about that time of the year, so I really look forward to it!” – *Mukund Gupta*





'TIS THE **SEASON**

AN UNOFFICIAL GUIDE TO ENJOYING WINTER

By: Jane Chui

As real winter rears it's (beautiful) head, I witness more and more students hunker down and shiver on the walk out to main campus, and exclaim to each other in the hallways, "It's too cold!" or "I hate winter!"

Snow, as I'm sure all of you can verify via google, is a collection of frozen water molecules. But science alone can't quite explain the feeling you get watching those gloriously unique flakes drifting through the sky, or coming down in fluffy clumps during a winter blizzard. Or that muffled serenity that envelops the world in a blanket of white just after the winds of a winter storm die down. No one can deny the beauty of snow-covered branches of an evergreen bough. Yet, why the hate?

True, as a Canadian I do have an unfair advantage of growing up surrounded by snow and ice, setting this type of winter as my norm, but I am convinced that everyone can enjoy winter as much as I do. Or if you are convinced of hating it, maybe hate it a little less with this short guide. Or at least try. After all, what with global warming and all that, winter might not be available for hating in the near future!

In my opinion, the key to enjoying winter is to be prepared. Winter in Cambridge can be tricky since temperatures often hover around the freezing point at 0C (32F), as opposed to being definitely below freezing the entire day. Having a touque (aka winter hat, knit cap) and gloves in your backpack is a must, as you never know when the wind will pick up, and it's the windchill that makes you think the weather report is wrong. Even if the forecast is for several degrees above freezing and the sun is bright, the biting wind will make it feel well below it. Often people think that wearing the hood on your jacket is the same as wearing a winter hat. It's not. This can be simply explained with the fact that air is a great insulator, and with a hood, you are blocking wind from only three directions. Once wind blows in the direction of your face, or even just natural airflow resulting from your trek forwards, the boundary layer of air around your head is disturbed and will likely be blown away. Wearing a touque, however, keeps that boundary layer intact, and hence, your insulation intact. Yes, you will have to sacrifice that perfectly coiffed head of hair, but you will be so much warmer with an actual hat. Whether wool or polyester, I would recommend one that covers up to the bottom of your ears so you don't end up with aching ears when the temperature dips. After all, keeping your head warm is key to keeping your whole body warm. This is because the blood vessels in your head are very close to the surface of your scalp (which is why head wounds bleed so much), so if the blood circulating through your head is allowed to cool off, then your whole body cools off at a quicker rate when this blood recirculates to the rest of your body.

Another trick to being prepared is dressing in layers. You may have heard this already, but it is well worth repeating. Typically, you start with the clothes you will need for the warmest you'll be that day (e.g. indoor temperatures during winter) and layer up to the coldest you'll be that day (temperature around the time you're heading back to Ashdown with a couple of degrees of windchill buffer). A good winter jacket goes a long way, but if you don't have one, layers can really make up for it because once again, more layers, more insulating air layers, more warmth. Even if you do have a good jacket, layers are helpful for the warmer afternoons so you don't end up sweating in your winter gear. Once sweat cools, you're bound to be cold! One typical layering I do is tshirt, hoody, fleece, and windbreaker. That last layer of windbreaker is a useful one given those frequent winter rains! As for pants, investing in a waterproof shell with lining is recommended. These can be just worn on top of whatever pants you are wearing, and will keep that penetrating chill of winter rain away!

And lastly, footwear. I hear complaints all the time about slush and it's an unavoidable man-made problem. After all, most of the slush we encounter is a result of all the salt we put down on our roads and sidewalks. Since Boston/Cambridge does not get a large amount of snow, knee high snow boots are overkill during most of the winter. Instead, I recommend getting a good pair of waterproof trail shoes (also called multisport shoes or low hiking shoes) that can double as your rainy day or winter shoes. These deal with slush and puddles well, and they are far less conspicuous than fur-lined boots that belong more when there are a couple of feet of snow out. In my experience, Columbia (no, I'm not getting any kickbacks from this and this is an unofficial endorsement) makes durable trail shoes with good traction that have kept my feet dry despite accidentally walking into deep slush puddles. Of course, it is also helpful to have an extra pair of socks and dry shoes at your office regardless of whether it is summer or winter!

Thus, I firmly believe that layering from head to toe and just overall being prepared will help you enjoy winter more. Happy wintering, and just remember, you can always add layers to stay warm but there's only so many you can take off to keep cool before you're down to swimsuit standards ... so does that not make winter better than summer?



MIT Architecture @ Chicago

By: Alice Kao

Masters in Architecture, Expected Graduation Feb. 2017

Back in early October 2015, a group of my 3rd year Master of Architecture classmates and I, along with our studio instructors, visited Chicago to attend the opening of the inaugural Chicago Architecture Biennale (just closed on January 3, 2016). The Biennale was held at the beautiful Beaux-Arts style Chicago Cultural Center adjacent to Millennium Park. As the first biennale held in U.S., the theme was “The State of the Art of Architecture.” The exhibitions were designed by local and well-known international architects as well as several affiliated with MIT Architecture. Almost all the who’s who in the American architecture academia attended (aka lots of people dressed stylishly in black). Projects included new urban visions for Chicago’s future, new housing prototypes, construction techniques, and “found architecture.” Other educational talks, site visits of the local architecture scene, and performances were part of the Biennale to further educate the public.

As the birthplace of the skyscraper, Chicago figures a prominent role in the history of architecture and generally, the history of America and its economy. Chicago is the hub of America’s rail, shipping and air corridors, and home to many renowned universities and research centers as well a major center for arts and culture. A incredibly rich and interesting city, we spent time walking through the Loop, stopping and admiring the modernist skyscrapers, visiting UIC’s campus, and enjoying classic Chicagoan fare like deep dish pizza.

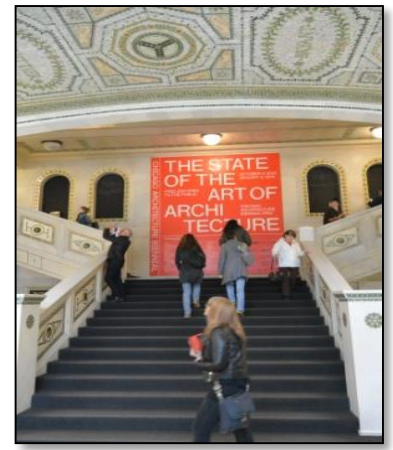
Of the places we visited, Marina City Towers was one of my favorite. We often passed by while walking to and from our hotel. When it was built, it was considered quite revolutionary. In the 1950s, inner cities were suffering blight but the architect designed a housing complex where all the amenities were provided onsite. Our studio instructor knew someone living in the tower, so we had the privilege to a personal tour of the interior and stunning views of downtown. I’ll highly recommend Chicago visiting if you have not before. Our stay was on the short side, but I will definitely like to go back in the future!



Chicago Architecture Biennale



Mies vs contemporary skyscraper, with Calder in foreground



Chicago Architecture Biennale



Rooftop view from Marina City Towers

The Dirty Secret of Biomass Energy

By: Kevin S. Kung

Biological Engineering, Expected graduation 2016

Since 2011, my main interest has revolved around biomass waste. Different people have defined biomass variously. In the discussion below, I refer mainly to plant-based residues, such as post-harvest farm and agricultural waste, and/or forestry waste.

Initially, I saw tons and tons of rice husks, sugarcane bagasse, and other types of biomass being burned. The problem, I thought, was that there was no good technology to turn this waste into fuel. So I started a company in Kenya focused on providing the technical process for turning this hitherto unharnessed waste into a low-cost, safe, and high-quality cooking fuel. Households, by buying such fuel, would save 20% on their cooking expenditures. By replacing traditional charcoal, this biomass-derived fuel would also save forests and mitigate greenhouse emissions.

Through the years, as I progressed on my company, and interacted with many more people in the biomass energy conversion sector, something gradually dawned on me. There are plenty of biomass energy conversion technologies out there—for example, biomass boilers (heat or electricity production), pelleting machines (solid fuel production), gasification (electricity production), and pyrolysis (liquid fuel). The possibilities are endless, and so are the biomass energy companies. What I gradually realized is that what is missing, in this case, is not the crucial conversion technology. Rather, it is the challenge of moving biomass waste from point A to point B.

If we think about the availability of biomass waste, we realize that it is available mostly in rural, dispersed locations in small batches. After harvest, the farm waste does not always present itself in satisfactory quality—such as moisture content and bulkiness—to be economically transported. If a batch of biomass is wet, then we are effectively paying freight to transport water. Likewise, if a batch of biomass is loose, then we cannot squeeze too much biomass mass (and thus energy content) into a truckload. Ironically, most biomass waste conversion facilities, on the other hand, are immensely centralized and capital-intensive installations. They often require at least tons and tons of biomass every hour to run themselves. Because collecting tons of biomass from rural areas is very expensive, most of these large conversion facilities can often only be co-located with existing agricultural processing mills. The city of Muzaffarnagar, in Uttar Pradesh, India, for example, has the nearby fiber-rich agricultural residue go to paper-making and/or boilers. Likewise, a biomass pelleting mill in the United States only collect the biomass waste from about a 50 km radius, and even so, transportation accounts for 90% of their production cost. These conversion processes are therefore, by and large, economically uninteresting in remote areas, where most of the biomass waste from the small-holder farmers still do not have a significant economic value. If there is no significant value to the farmers, then farmers, after a harvest and anxious to clear their land for the next planting season, may simply choose to burn their biomass on-site in the open air. By analogy to the gas industry, the energy in the rural biomass waste today becomes “stranded”, and cannot go to a viable market and can only be “flared off” on-site. In a series of satellite images taken by NASA in 2013, we can see the plumes of smoke rising from the fields in Punjab, form some macroscopic turbulent structures, and cover up much of northern India, including Delhi. This may be one contributing reason why cities like Delhi is very smoggy. This is therefore a severe public health concern. But the story does not stop there. A recent 2014 Stanford study (Jacobson, 2014) shows that burning biomass may contribute to up to 18% of global anthropogenic CO₂ emissions. But what is more is that by burning biomass in their field, rural farmers are burning an equivalent of US\$120 billion/year in cash that they could have potentially earned, if they had the chance to economically convert and sell their biomass waste as a valuable product.

This is one reason why I decided to dedicate my PhD research at the Tata Center to looking at a way by which biomass waste can be densified on-site in the farms before transportation (through a thermochemical process called torrefaction). Imagine a mobile, low-cost, and easy-to-operate unit that can travel from farm to farm after a harvest season, converting the biomass waste into a more densified form with a much longer shelf life and less moisture. This then becomes a product that can be much more easily transported and processed. The biomass energy producers can now source their input feedstock at a lower cost. This value chain may even expand to new rural areas whose biomass waste was previously burned in open air, creating an additional source of income for millions of remote farmers.

Satellite image showing smoke plumes from open biomass burning in Punjab

