# THE ROAD TO TUITION

The Year in Review

The Pioneer

# THE *ROAD* TO *TUITION*

The Year in Review

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# NEWS

# *Financial Update: Jamshed Bharucha*

**Marcus Michelen (BSE '14) and Saimon Sharif (CHE '15)**
*Originally Printed in Issue #2*

There are many rumors circulating that concern the future of Cooper. With anxiety surrounding the upcoming meetings of the Board of Trustees growing at uncontrollable rates, we reached out to President Bharucha to give us a more clear picture of Cooper's future.

**The Cooper Pioneer:** The last Board of Trustees meeting was on September 19th. Could you summarize the outcome of this meeting?

**Jamshed Bharucha:** The outcome was to set the stage for the next meeting (the December meeting) by setting out the timeline I had communicated to the deans and the faculty of the three schools. November 15th would be the date by which the faculties of the three schools would agree on a plan to go forward. I would integrate those plans and take them to the board meeting in December. That was basically the outcome of the meeting - a timeline.

The board would then digest the plans. including my own recommendations, and they might take some time to do that. So there won't be an announcement in December, but in the New Year at some point we would announce any decisions that might have been made. At the board meeting, we talked about the three criteria that should be considered in the strategic planning that the faculty are engaged in.

The first is maintaining academic excellence. Cooper Union has the finest student body, bar none, in my opinion, and that is our great asset. Together with the excellence of the education and the excellence of the faculty, Cooper has an unparalleled learning community.

The second point is vision. The plans should be not just to solve a financial crisis, but an opportunity to position our schools and programs for the future. The future of the city, the future of the country, the future of the world.

The third is that the plans must be financially sustainable. All three go together and I'm happy to elaborate on any of those. So the board discussed all of those pieces, what might a vision be like, what constitutes sustainability, and why.

**TCP:** Is the financial sustainability criterion specifically just quantitative or is it also based on reliability?

**JB:** Sustainability has to include an assessment of the risks of that plan. Any plan has risks. And any plan has pros and cons. A lot of people come in every day telling me what the cons are and what the problems are about any given option, but a lot of people also come in with solutions and plans that are not only viable but very exciting. I think we need to focus on those.

**TCP:** In the event that the Board of Trustees decides to close one of the three schools, what would happen to current and incoming students?

**JB:** I said when I spoke in Rose Auditorium a year ago in October, quite forcefully, "I'm not here to close a school." I'm a teacher, I'm an educator. I'm here to ensure that Cooper Union thrives. Thriving, to me, means that we continue to operate and we do so in a vibrant way.

Obviously, we're in a tricky situation. We have to be mindful of all possibilities, but we have already stated in April that the class coming in the fall of 2013 would be admitted without any alteration of our policies and that would see that class through. Should any of our current policies change, they would only affect classes beyond that, except for the master's degree in architecture. That degree, which is well established and attracts top students from around the world, would have a change in policy, starting in the fall.

**TCP:** I understand that it's your role to make sure the schools do not close, but it is my understanding that in December, it is the purpose of these financial plans to decide whether the three schools are going to stay open. Is this correct?

**JB:** It's more complex than that. It's more subtle than that. The goal is to stay open, to survive and to thrive. In order to do that, the plan has to be sustainable. It's almost axiomatic that if the plan is not sustainable, it cannot be sustained. I've said and I believe very deeply as a faculty member that the faculty is at the core of our educational enterprise. I don't think any faculty member would disagree with that. I cannot impose a plan, nor can the board, and I have made it clear to the board that neither

of us could impose a plan over the objection over the faculty ; it won't work because the faculty are teaching the students. The faculty have to believe and support not only the educational programs that they provide, but also the philosophical basis of those programs. So the purpose of the faculty focus this fall is for the faculty to find where they can agree on a model that has these components. Faculty agreement on a sustainable model has to be a foundational assumption, it seems to me, in order to be sustainable because you can't have a successful institution if it is operating in a state of dissent.

Lincoln said: "A house divided cannot stand." It's the same thing at Cooper Union. Obviously there's going to be disagreement, and not everybody is going to support every piece of every plan, but I think the faculty of each school must (and they are doing so with admirable commitment) come together to support a plan that is appropriate for that school. It's also not a one-size-fits-all. Engineering is quite different from Art, even though we are a union.

I want to work very hard to find ways for greater collaboration between the schools, to bring the advancement of science together with the advancement of art. But the fact of the matter is that you are enrolled in a particular school and there's a curriculum Even as we try to bring the schools together, it's really the faculty of each school that understands best what's appropriate for that school. Faculty support for a viable, strong solution that is academically excellent, visionary and financially sustainable is the goal here and is a prerequisite for what we do.

**TCP:** If one of the schools fails to meet one of the three criteria, however, what would then happen?

**JB:** It's my job to make sure that it doesn't happen. I'm not just waiting until November 15th. I'm working with the deans and the faculty. We've provided them with the resources in terms of expertise and consultants to cost out various plans and to look at the benefits and the risks. I'd say that this point, all three schools have bought into the process. We are committed to making something that works.

So there's no point talking about the "what-ifs". We can talk about all kinds of "what-ifs" but I think we're here to make it succeed. I would say, as of today, we're already at a point where the faculty are engaged in constructive dialog. Obviously if a school comes up with a plan we think is not viable, then I think the first thing we do is go back to the school and say, "this is a problem. Let's try and fix it together."

As long as there's that will to engage in vigorous civil discourse and overcome differences, we'll find solutions. Will they be easy? No. If you've seen some of the financials, you'll see why. We can't be sanguine. There might still be pockets of our constituencies who feel that there are solutions that don't involve difficult decisions, or who feel that the financial problems are caused by this or by that, by the building or by an administrative bloat or so on and so forth.

I think you'll see if you actually go through the numbers, that there is a long standing disconnect in the budget that goes back at least forty years that was greatly exacerbated in the early 1990s because of the falloff of the rent streams from the Chrysler building. That has been overcome through the years because of super-charged stock market returns, because of selling assets, because of borrowing, and now we're at a point where there are no stock-market returns and we don't have that many assets left to sell.

We've borrowed a lot of money and now it's time to say, "Let's make it sustainable." The principle source that has funded the Cooper Union since the Chrysler building was built in the 1930s does not keep up with inflation, even with the lowest assumptions about inflation. Expenses are exponential, because of inflation. Higher education inflation is around 4% to 5% annually.

Even if we assume a 3% inflation, which would be the consumer price index for items other than healthcare, and then 7.5% a year for healthcare. Remember that benefits are roughly 9 million dollars out of our 60 million dollar budget. If the healthcare benefits are growing at 7.5%, you've got an exponential function where the expenses are compounding by a blended inflation rate that's 7.5% per year for healthcare expenses and roughly 3% to 4% for other things. We can talk about shutting down this, or cutting that cost, and we're looking at all the possible ways to cut cost.

But in the end, cutting costs brings down the y-intercept and shallows the exponential growth; but eventually the exponential function catches up. On how Cooper Union is funded, there are many funding sources, but the main one is the Chrysler building. There are two components to that: the rents and the tax equivalencies. The rents are on a step function with a flat portion of the step that goes for ten years. Now the next step up is 2018-19, when we get a big boost in rent. But there's a mistaken belief out there that that solves the problem.

The reason it's mistaken is that after that it's flat again, the exponential cost function eventually overtakes that no matter what assumptions you make about spending cuts. The following step-up in 2029 is so small as to not be able to mitigate inflation, and you've got a situation of mounting deficits as far as the eyes can see. Actually this problem was known as early as 1969. It's just that the institution took a number of steps: they closed Green Camp, they closed the physics programs, they sold the Bowery Bar, got rid of the Cooper Hewitt museum.

Those were all well-intentioned decisions to try to preserve the full-scholarship for all enrolled students. But as I see it now, we are at a point where we have to come up with a sustainable model. We have the time to do it while preserving academic excellence and being visionary. But if we wait too long, it becomes harder and harder to do something that's visionary.

**TCP:** I don't want to go too far into the "what-if", but is it true that regardless of what happens with the Board of Trustees decision later this year or early in 2013, that all current students would be able to finish their education at the Cooper Union?

**JB:** Yes. All current students would be able to get degrees from Cooper Union, assuming they meet the requirements.

**TCP:** Last year, it was announced that the engineering grad school would start charging tuition. Where are with that plan now, exactly?

**JB:** Actually, that wasn't quite accurate. The announcement was that we are going to lead with the hybrid model which was, and still is, the idea that the more revenues you can get from programs other than the undergraduate programs, the smaller the problem becomes. If you ever do have to go from 100% tuition scholarships to something less than that, the burden is greatly lessened by these other programs. The architecture graduate program will start contributing to their revenue target. If the engineering faculty decide that that's not the place to go, that there are maybe other ways, then that's an option. We have not actually decided that engineering master's program will start charging tuition. It may happen. It may not happen. There may be new programs. There may be changes in our current policy. All of that is part of the planning process under way.

**TCP:** Do you have any closing comments that you would like to say?

**JB:** I do. I think that it's really important to remember that in spite of all this, Cooper Union has a brilliant future. I assure all of our current students and former students that your degrees will be ever more respected and worthy as time goes on. We will overcome these challenges, not without controversy, not without difficult decisions. Anybody that tells you there is a straightforward path forward, I believe, does not understand the problem. It is complex and only can be understood if you're prepared to understand the complexity. But we will overcome it.

The community is coming together as we've gotten more information out, through FAQs and other means. [Vice president] T.C. [Westcott] has met with people and continues to, and I meet with people every day to facilitate communication. Cooper has a brilliant future.

New York City is going through a renaissance. It's the most exciting time in New York City's history in easily half a century. I go to lots of meeting at the mayor's office and with business leaders and educational leaders in New York. As you know, the mayor has launched this technology initiative to make New York a leading technology innovation city. New York is already a design center.

We at Cooper have, in some sense, many of the ingredients: we have a school of engineering, a school of art, a school of architecture and a faculty of humanities and social sciences.

If we can bring those together in exciting ways, which we will, we can position ourselves within this new New York renaissance, particularly since we're in such a hot neighborhood as well

as being one of the most exciting institutions contributing to the city, the country and the world.

I see this as opportunity - not without a lot of hard work and not without some bumps in the road. I can assure you that whatever plans we announce in January, they're going to need modification because whenever you're doing new things, you learn as you go along. We will come out at the end an even stronger institution. We will attract the very best students. We will provide an exciting education.

Looking back people will say that this was opportunity seized in the wake of a crisis. I hope that people will join me in doing that. I do think that in terms of the discussion in the community, understandably, there was anger and indignation because it was quite a bit of surprise that Cooper Union had these challenges.

But I think that as we go forward, the tone has become a lot more positive and constructive as people approach it from the point of view of "how can I learn the facts" and "how can we brainstorm solutions" and "how can we come together".

Even though we might have differences, in a civic debate, however vigorous, if we can have those conversations as we are having now, in a constructive and respectful way, we should be able to demonstrate to the world that the country should be able to solve its problems. We are an educational institution. We can set an example for how people can come together, and perhaps our politicians can follow our example.

Peter Cooper wanted students to learn how to engage in democratic civic discourse, which means disagreeing vehemently but respectfully, based on fact and reason. People ask me, given all the protests, what motivates me, I have one word answer: it's the students. Every time I get to meet with the students, whether it's on Cape Cod with the athletes, whether it's with the origami club or the class that I teach, or meetings that I have with students, I'm reminded of that. That's why we're here, is for the students. That's why we will succeed.

# Foreign Exchange Students at Cooper

**Yara Elborolosy (CE '14) and Hindi Kornbluth (CHE '14)**
*Originally Printed in Issue #2*

Despite its small size, Cooper Union still manages to offer students a foreign exchange student program. This year, Cooper Union has five students from abroad studying here for either a semester or a year. Two are from Germany, two are from Spain, and one is from Iceland.

Cooper Union has also established connections with universities at these three countries that allow students from Cooper to study abroad during the summer. We were able to briefly interview three of the students: a junior civil engineer, a senior chemical engineer, and a senior mechanical engineer.

### Alejandro Lanuza: Junior Civil Engineer. From Spain

**The Cooper Pioneer:** What school/year did you come from?

**AL:** The University of Burgos and I am in my third year. It is technically four years but you have to do a master's degree because without it you can't sign projects so most likely you won't get hired. The master's degree is a two year program.

**TCP:** Why Cooper?

**AL:** My university has a student exchange program. Every year there is a vacancy and students can apply. There are other universities affiliated with the exchange program but that involves having other students from the universities coming to my university as well. For example, if I was to study with one of those universities, they would send another kid to study at my university. It doesn't have to be the same degree but the numbers have to match, more or less. With Cooper, it is just our university sending students over and Cooper decides on whether to accept each student.

**TCP:** What are the differences between studying in NYC and studying in Spain?

**AL:** Here the classes are more focused on practical applications while in Burgos it is more theoretical. The things you are taught here you will use in your future careers and work environments. In my city, there are 200,000 people and the university has about 11,000 students.

**TCP:** Is NYC what you expected it to be?

**AL:** I thought it was going to be cleaner than it turned out to be. The ideas I had of NYC came from the movies I've watched that were filmed in NYC. I love the atmosphere, the people, and the friendliness of the city.

### Halldis Thoroddsen, Senior Chemical Engineer. From Iceland, here for the year.

**TCP:** How did you hear about Cooper?

**HT:** When I was looking for an exchange program from the University of Iceland I just went through the list of schools they had for chemical engineering and one of them happened to be Cooper.

**TCP:** Why did you pick Cooper?

**HT:** Mainly because of the location. You don't get the opportunity to study in New York City often.

**TCP:** What are the biggest differences between Cooper and your home school?

**HT:** Midterms! Almost all of our finals are [worth] 100%. My school is also bigger, it's like the biggest university in Iceland (they only have 4). But mainly the program is the same.

**TCP:** How are you enjoying New York?

**HT:** I really love it here!

### Blanca Quiralte, Senior Mechanical Engineer. From Spain, here for the year.

**TCP:** What school/year did you come from?

**BQ:** I came from ICAI, an engineering school from Madrid, Spain.

**TCP:** Why Cooper?

**BQ:** When deciding which school I wanted to go to, I did some researched and I found that Cooper was a very good engineering school. It was a great opportunity for me and it would open many doors for me in the future. I also thought New York was a plus in my decision. So I guess the school's reputation and its location made me choose it.

**TCP:** What was the biggest difference between NYC and your home city? Biggest similarity?

**BQ:** The biggest difference I can see is the absolutely amazing culture cocktail NYC has. The biggest similarity is the dynamic of the city, how you can always find something to do.

**TCP:** What do you think of the experience so far?

**BQ:** I think it will be a unique experience, not only in an academic but also in a personal way. I want it to make me more of a professional and more skilled person.

# Cooper Union Origami's David Yurman Display

**Caroline Yu (EE '15)**
*Originally Printed in Issue #5*

If you walk by the David Yurman designer jewelry store in Manhattan (as well as three other locations nation-wide), you'll see a 33' origami torus made of 105 sheets of hand-cut paper. These creations are covered with approximately 35 red origami berries. The "berries" have LED's wired into them so that they light up at random intervals, making the model twinkle.

These displays were created by The Cooper Union Origami Club.

The fact that all four displays were designed and constructed in less than a week makes them even more incredible. Origami Club president, Uyen Nguyen (ME '14) says that "the timing was our greatest challenge…the group effort was amazing, and I was personally touched by the incredible amount of effort my club members put into this. I honestly believe that, of our group's current regular members, had we been down by even one person, we would not have finished the job. I am amazed and thrilled by the dedication my members have to this club."

The idea of having origami as a window display was proposed by Richard Barrett, who works for David Yurman. He was unsure of what to do for a window display but when he went to Parents' Day at Cooper because his son is an architecture student, he saw President Bharucha talking about the Origami Club. The Origami Club had made the President a torus and Richard Barrett thought that origami would be a good idea to use in their holiday window display. Richard Barrett then contacted student services, who then contacted the Origami Club.

Approximately 300 man-hours were spent making the torus. The club pulled consecutive all-nighters to finish the torus. Uyen describes it as a "club meeting that lasted more than 72 hours." Harrison Cullen (EE '15), believes that "[he] couldn't find a better group of people to fold paper with…while horribly sleep deprived."

All compensation that The Cooper Union Origami Club received for their work will be donated back to Cooper. If these displays inspire you to fold something amazing, join the now-esteemed Origami Club!

*All images courtesy of the Cooper Union*

# Cooper's Hurricane Sandy Response Team

**Sean Cusack forward by Yara Elborolosy (CE '14)**
*Originally Printed in Issue #5*

Hurricane Sandy affected people in seven different countries and in twenty-four states across the U.S.A, killing two hundred and fifty three people and costing at least 65.6 billion dollars, 63 billion being in the U.S. alone. 41 Cooper Square lost power initially and tried to use a back-up generator to compensate but the back-up generator failed by the next morning. Inspirational stories of people helping out those devastated by the storms could be found in every newspaper and now, the Pioneer will thank Cooper's own personal heroes. This article was kindly provided to us by alumnus and adjunct professor Sean Cusack.

In the dark of the power outage, with no sign of the early morning light outside, figures are dragging industrial equipment up the stairs. It's the Thursday after Superstorm Sandy, and the 1-Megawatt diesel backup generator had failed. Jeff Hakner (EE '91), and Jody Grapes, Director of Facilities, are carrying a smaller spare gasoline-powered generator up eight flights of stairs to the Alumni Terrace and within reach of the computers that need electricity. They and a small group of staff and engineers arrived before the police-enforced 6 am curfew to check critical systems, repair any damage that might have occurred, and prepare the campus for the next few days.

A week earlier, with forewarning about the storm, the systems seemed to work according to plan. Cooper was ready with a day's diesel in its generator, in case of temporary blackout. The fuel could be stretched if additional facilities were shut down. But sometimes, fate intervenes.

The generator kept up with demand for eight hours during the blackout, then suffered a failure due to low oil pressure and went dark. The computer systems were abruptly shut off in the middle of operation, and with the computers down, so went cooper.edu and email.

Administration reacted and called in tech specialists to repair the generator, but soon discovered the problem went beyond the low oil pressure. The local team didn't have the parts necessary to discern or repair the problem. A new plan was hatched on Wednesday night by President Bharucha, TC Westcott, Jody Grapes, and Bob Hopkins to bring up critical systems and to restore internet and email service and the website if possible.

Back on the 8th floor on Thursday, the gasoline-powered generator that is usually only utilized for small outdoor lighting and power tools is only 3500W, barely enough to run a few of the servers behind the computer center. Jody, his team, and Jeff get it running outside on the Terrace – the generator cannot run indoors due to the risk of carbon monoxide.

Meanwhile, on the 10th floor, engineers continue to work on the diesel generator but even the service tech can't get it up and running; the main repair team from Detroit Diesel will have to come in. They won't arrive in time during this blackout.

Jeff splices custom power extension cords and runs wires from the Terrace into the server room behind the Computer Center. Each server takes almost 1000W, so there's not much room for error keeping basic services alive. After removing the redundant backup power systems and pulling line cards in the servers to reduce the amperage draw, email and internet come up.

Jeff is able to fix the hard power-off software issues. For now everything is running on the gasoline, but there is not enough fuel to last for very long. Unfortunately, the natural-gas powered Co-Gen plants in both buildings – though they work properly – can only share load on existing ConEd power lines, and with the ConEd lines dark, the Co-Gen Plants cannot provide power. With some modification they could be

independent but that's something to plan for another time.

As the gasoline starts to run out, the team looks for any nearby source. But just like everyone else in Manhattan, they find it impossible to access any. This time, knowing that another outage is coming, Jeff properly shuts down all the systems so they will be easy to reboot when the power is up. Cooper goes dark gently. Come Friday morning, there is still no gasoline to be found and Jeff Hakner is driving through Connecticut searching for some when he gets the call that ConEd will soon be bringing the power up. When the lights all turn on again in the East Village, Jeff is able to bring the Cooper Union systems back up remotely from his home, thanks to shutting them down correctly the evening before.

On Saturday morning and with driving restrictions still heavily enforced, Brian Cusack (ME '01), takes a 3-hour bus ride from central New Jersey into the Port Authority and, with the subways still shut down below 34th Street, catches a cab down to Cooper. He spends the morning plugging the line cards back in and replacing the redundant power lines. After removing the low-power usage special settings put in place two days earlier, he brings all the other servers back up to normal. The web is up! Datatel also seems to have suffered no serious damage, though it will be until the next week before that is officially running, thanks to more effort by John Kibbe.

Thanks to the hard work and long hours of Facilities, Security, and the Computer Center staff, and despite an unforeseen generator failure, Cooper had power while many did not and was running full-steam ahead by the beginning of the week immediately following Hurricane Sandy.

# Dean Wolf: School Update

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #6*

*Photograph by Jenna Lee (ME '15)*

**The Cooper Pioneer:** At the end of last semester, ABET came to evaluate our engineering school. How did that go?

**Alan Wolf:** We had an excellent visit. ABET reviewed 36 items and 33 of them required no change. The other 3 things are minor. ABET concluded their visit with a formal exit interview. That meeting included myself, Assoc. Dean Delagrammatikas, President Bharucha, the four chairs of Cooper's degree granting departments, and from ABET the four program evaluators (PEV's) and the visiting team's chair. They talk about strengths and perceived weaknesses of our programs. They rate concerns on a scale that includes: deficiencies, weaknesses, concerns, and observations.

The program evaluators, as you'd expect, are experts in the discipline they come here to review. So a civil engineering PEV would be a professor or dean of civil engineering at another institution. At the exit interview each PEV reads their draft report, which begins with a brief history of the department and then proceeds to a review of what the evaluator found in their preliminary study of Cooper (they study us before they even arrive on campus) and in the on campus visit, which ran from December 2 – 4. A sample comment might be: "Faculty seemed to be very engaged with their students" or "Alumni seemed to feel that…" The team chair also read her report, which was concerned with the engineering school overall.

So, nothing particularly serious came up in the exit interview. There are some minor concerns that we are either obligated to respond to, or can choose to respond to. I'm very pleased. This is a good time to thank the faculty, students and staff who helped us in many diverse ways to show off the School of Engineering to its best advantage. Special thanks to Cooper students Andrew Crudge and Mike Palafox, who designed and built our new faculty web site, https://engfac.cooper.edu/ Our visitors were impressed by both the faculty and student work that is now on display there.

A few days ago we received a written version of their reports. I haven't had a chance to review them yet. We now have 30 days to respond. Some departments, such as civil engineering, will not respond because nothing, not even a minor concern, was found in that department. Other departments may disagree with minor concerns, and they may wish to express those to ABET, or they may decide to change departmental practices to conform to ABET standards.

I should mention that the reports themselves are confidential. Also, that it is nearly impossible for academic programs these days to get a "perfect" result, a clean bill of health, regardless of whether we deal with ABET (engineering accreditation) or Middle States (accreditation for the entire institution).

**TCP:** Do you think that the protests that occurred in early December will have any effect on our ABET results?

**AW:** No. I was at an AITU [Association of Independent Technological Universities] conference in San Diego recently. One of the speakers at the conference was the head of an engineering accreditation organization, but a different organization (not ABET). It was a very interesting talk. For example, I learned that accreditation began after World War II, when the G.I. bill allowed retuning soldiers to receive financial aid for college (among many other benefits). The government was concerned that soldiers might be taken advantage of by educational institutions of poor quality. Anyway, someone from another institution asked the speaker: "Do accrediting organizations care about a college's financial weakness or internal debates?" Her answer was very similar to remarks made by the ABET team chair in our recent visit – such matters are not of direct concern. If, however, things like financial problems point to underlying institutional problems that affect the school's educational mission, then they will receive an appropriate amount of scrutiny. In any event, recent events at Cooper were not mentioned in our ABET exit interview.

The purpose of ABET is to make sure that you do what you've promised to do in your educational programs. They want to check that there are procedures in place to fix things that are broken. That includes insuring that we "close the loop." What that means, formally, is that we use the results of 'assessment' to improve our institution, programs, and courses. For example, at the level of an individual course, you, the instructor, have an idea of how you're going to teach a course. You teach it. You assess

to see if your objectives were met. If they were, great. If not, the assessment (however that is done – there are a number of ways) is feedback to you that may suggest how to teach the course more effectively the next time you teach it. They don't have the 'manpower' and time to see what actually happens in each classroom, but ABET does verify that the feedback loops are in place.

**TCP:** Last December, it's my understanding that the engineering faculty prepared a document that was presented to Jamshed which was presented to the Board of Trustees.

**AW:** We prepared five reports, they've been posted on the web and otherwise widely distributed. We prepared an undergraduate tuition report, a graduation tuition report (that's a misnomer, it includes any program that generates revenue and is not an undergraduate program). We also had three committees that weren't about revenue generation – for example a committee on the engineering school's culture. The reports were given to the board with supplementary materials like Excel spreadsheets containing very elaborate models of revenue generation. Our five reports totaled nearly 100 pages. I was told by some trustees shortly after the December 5th meeting that they were very impressed with our hard work, our creativity, and with the sophistication of our models. I'm very proud of the faculty for mobilizing on reinvention the way that they did. The trustees are now studying our reports. We expect to hear back from them in March.

**TCP:** In March?

**AW:** We had originally expected to hear something in December. Then came the holidays, etc. Now they have to study our reports and our models. That takes time.

I'm still not clear what will happen in March exactly. Will they tell us our fate? Perhaps. Will they want to talk to us in March before deciding our fate? Ask more probing questions? Will we be contacted before March with those questions? I don't have answers to these questions.

**TCP:** Do you have any information about who our permanent dean will be?

**AW:** On February 5th, we're getting an update from the search firm that has been seeking out candidates. On that date, I think we're going to be generating a short list from the full list of plausible candidates. We will rank them based on lots of criteria, such as their leadership style, their experience in financial and budgetary matters, their track record for building partnerships with the private sector, their commitment to undergraduate education, their passion for directly interacting with students, high energy and work ethic, and several other factors. The firm has been helpful. Two years ago the Dean Search Committee did a search without the assistance of a search firm, and we didn't find anyone who really excited the faculty. The search firm hasn't just placed ads for the position, they went out to actively recruit candidates.
As you may notice, I have a new clock on my desk. It's a countdown clock showing how many days I have left in my position as Acting Dean. Right now, 118 days, 15 hours… I'm eager to have a new Dean in place. It's interesting work, and I enjoy working with the President's leadership team, but this job, when done properly, requires an enormous amount of time and effort. And a great deal of time spent in meetings. I'm at 300-400 work-related emails a day, and can barely keep up. So much time handling relatively minor matters that it is hard to find time for the bigger, more exciting tasks – like designing a program to be held this summer whose working title is "Cooper Invention Factory." More on that soon! So I will be the first person to champion any new plausible candidate (laughs).

We have a timeline for the selection process. After we generate a short list of candidates there will be rounds of interviews, off campus and on campus. There will be meetings with faculty, students, and administrators, and perhaps presentations to these groups. We recognize that finding someone terrific is a challenge given Cooper's current financial situation and internal debates. By the time we are closer to the end of the timeline, we will be past the March trustee meeting – so I expect that we will have some sense of the institution's fate. There are people who revel in addressing challenges like this. I hope we find someone like that – a fixer.

As for our financial challenges, Vice President Westcott is working very hard on a financial package that will keep us afloat until 2018 at which we get a few years of relief from the Chrysler rent bump. If anyone can do it, it's TC.

**TCP:** As head of the physics department, have you begun looking for a full time faculty professor to replace Professor Uglesich?

**AW:** No new searches for faculty members right now. We have a few departments in engineering that are losing visiting faculty or faculty through retirement, but until we know the fate of the school(s) it doesn't make sense to look for new full time faculty. I hope to revisit this after the March meeting.

# New ID Scanners

**Saimon Sharif (ChE '15)**
*Originally Printed in Issue #7*

On January 23rd, a campus notice was sent to faculty, staff, and students with the subject "A Message About Safety." The email stated that faculty, staff, and students attempting to enter 41 Cooper Square (NAB) would be required to swipe in using their Cooper Union ID card. The same group must show their Cooper Union ID to the guard when entering The Foundation Building. Previously, the ID requirement was only occasionally enforced.

According to Dean Lemiesz, the change in ID policy is due to a higher frequency of incidents involving outside individuals, formerly related to Cooper Union, gaining access to our buildings. A swipe policy for the NAB has been planned when the building was first constructed, but other matters interfered with the activation of the card readers at the guard's stations. A number of NYC, e.g. BMCC, Hunter, and Columbia, require swipe access.

According to Dean Wolf, no new equipment was purchased to implement the new swipe policy. The card readers at the guard's station employ the same system as the laboratory ID card readers in the NAB. A picture of the ID holder appears before the guard when the ID holder swipes, so intruders cannot use a student's ID. Dean Wolf stressed that the activation of the card readers is part of an ongoing experiment, which may also involve the addition of custom holograms to ID cards for students in the Saturday Program, Summer Program, and Continuing Education programs. A more comprehensive safety policy will also require clarification of guest pass policies, and a determination of whether identification will be required for those attending Great Hall Programs, the End of Year Show, and gallery events.

# Brian Cusack on Datatel

**Caroline Yu (EE '15)**
*Originally Printed in Issue #8*

Every Cooper student remembers the night they registered on the WebAdvisor website. Many frustrated students contacted professors and staff members about the new online registration system. However, WebAdvisor is only a part of a larger software program that is being implemented at Cooper. Data can now being integrated across departments. Here's what the new head, Professor Brian Cusack, has to say about the administrative software, Datatel Colleague.

**The Cooper Pioneer:** Can you describe your new role as head of Datatel at Cooper? What are your main objectives?

**Brian Cusack:** In short: it is my job to see that we use the software to its optimal potential. This breaks down to a number of responsibilities; some are short term and some are long term. We are "live" on most of the modules within the system, but there are still some departments that are working through migrations.

In the short term, it is my job to oversee the successful migration of the remaining modules and deployment of the remaining software applications. Longer term I will be working with user areas to prioritize the needs of the institution and coordinate modifications or enhancements as necessary. I am responsible for developing training programs and documentation so we can implement best practices throughout the institution.

Implementing an integrated software package like Datatel is a large undertaking, but the process allows for two important reflections:

• Looking outward - what new features does the software provide our procedures?

• Looking inward – how can updating our procedures gain the most from the software?

I'm here to make sure we make the most of the opportunities both of those questions present.

**TCP:** Why did Cooper decide to implement Datatel?

**BC:** In 2008, Cooper performed a Self-Study in preparation for the decennial Middle States accreditation visit. In 2009, the Information-Technology (IT) Committee was convened as specified by the Self Study. This committee was attended by individuals throughout the institution: faculty, administration, staff and students.

The committee visited other campuses, went to conferences, and discussed the needs of Cooper Union. In 2010, the committee submitted its final report. While its conclusions were many and varied, there was one clear overarching recommendation: "In summary, Cooper Union must install a web based integrated enterprise wide system that encompasses all elements of the delivery of a high quality Cooper Union education. Such a system will include modules that address finance, student, human resources, institutional advancement, advisement, course management and room scheduling. The ideal system will be modular in that each component can be implemented on a standalone basis and integrated as additional modules are implemented."

Prior to 2011, The Cooper Union housed its data in siloed systems. Each department had its own management system and data warehouse which were selected at various times over the last 30 years. This led to many diverse systems across campus, many of which became problematic to reconcile.

In the late fall of 2010, Cooper Union began researching companies that could fit the requirement put forth by the IT Report. All sorts of programs were researched – but most were too big for us, like the very popular Banner. The field of choices was quickly narrowed to two candidates: Power Campus by Sungard HE and Colleague by Datatel.

Both companies came on campus and presented to stakeholders throughout the institution. At the end of the presentations, feedback from the stakeholders was considered, and Datatel was chosen as the integrated enterprise system for Cooper Union.

**TCP:** How has Cooper benefited from Datatel?

**BC:** Cooper is already seeing the benefits of Datatel. Some of these include:

• Data integrity and consistency. For example: when a department looks up the address of a student – every department will get the same address. This sounds simple, but with separate systems it was not unusual for something as simple as an address to vary greatly depending on which department you asked.

• Web-based access: among other actions, students can now register online (I know that was a big deal for the students)

• Admissions can now send out automatic communications to email accounts, and students can check their status of their application online.
• Professors have access to advisement tools they never had before.

• The business office has modern reporting tools they never had before.

• We are implementing scheduling software that will help us make the most of our limited space and resources.

**TCP:** What has been the most difficult aspect of Datatel to work with?

**BC:** I'll give you two: change and workload. Change is always hard. We are changing from diverse systems that were largely custom designed for individual tasks to an integrated system that is designed to work for everyone. Getting what you need (individually) from a system designed for everyone requires a bit of patience. Some individual tasks may not be as simple as they were before; however, they will be far more accurate in their results.

The added workload of training and migration is significant. We couldn't stop running the school just so that everyone could be trained on the new system and work through the arduous task of migrating data from the previous systems. Many individuals have had to continue fulfilling their full time responsibilities while somehow fitting in the training and migration needs. It has been tremendously taxing on everyone but the dedication of the Cooper staff has been nothing short of miraculous.

Neither of these difficulties are unique to Datatel. They can be expected from any mass-data-migration. For their part, the consultants and technical support team at Datatel has been extremely helpful.

**TCP:** Do you have any advice for students, professors, or staff members who are still trying to fully transition to Datatel?

**BC:** Please be patient but don't be afraid to share questions or comments. We are all learning and training as we go. If you have questions, don't be afraid to ask. If something is confusing – let me know; one of my new responsibilities is to coordinate documentation and training.

# *Stock to Replace Brazinsky as ChE Chair*

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #9*

For the past couple of weeks, there have been rumors circulating that Professor Stock had replaced Professor Brazinsky as Chair of the Chemical Engineering Department. Last week, I sat down with Professor Stock to find out what happened. Reproduced below is an exerpt from what Professor Stock said during the interview:

Professor Stock: Basically there was a faculty meeting early February. I made a case for why I thought it was my time, and I was elected [chair of the Chemical Engineering Department]. Part of [the reason I wanted to run], is that I'm not planning to be one of those professors at Cooper Union who basically stays here until they drop dead.

So it would be nice to spend a couple of cycles being chair of the department before I start thinking about retiring. So that was partly my motivation and partly because I think it would be a cool thing to do.

Professor Brazinsky is still chair, and will be chair until September 1st. Quite often at Cooper, changes in chair happen when chairs retire. So, to a certain extent, I kind of consider myself pretty lucky because Professor Brazinsky isn't retiring yet so that's going to be very useful because there's always someone I can talk to who knows what the deal is. He's going to have the chance to get back to some of his teaching, which he enjoys.

I'm not expecting any earthquake type changes or anything. The departments in Cooper run a little bit differently. Each one has its own kind of character. Ours kind of runs like a committee. People have their own particular view on things.

Sometimes the meetings can be passionate, to say the least. There are things that some people want to do and others want to do differently. We always manage to thrash it out and come up with changes and improvements in what we hope is a kind of thoughtful way.

# Guido Interview: Scheduling

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #10*

At some point in the semester, a schedule for the upcoming ing semester is released. We usually don't think much of it; we figure out what classes we want to take, put them into a Google calendar or Excel Spreadsheet and hope the gods of Registration and Datatel are kind to us. Last week, I sat down with Professor Vito Guido, the man who makes the engineering schedule each semester to get insight into his process. He gave the Pioneer the following statement:

Each semester, in the Fall and in the Spring, I send an email to the seven department chairs in the engineering school. So let's say for this particular Spring semester, for registration for the Fall: back in late January, early February I started requesting to have the information back by February 14th so I could start making the schedule, because invariably there are going to be changes made in the schedule and we would like to have them completed as soon as possible before registration.

So what do I include in that email? A request from the department chairs saying what courses are going to be offered in the fall semesters; who's going to teach those courses; what special requirements they have. When we were in 51 Astor Place, not all the rooms were smart classrooms. Here they all are, so that's not a problem.

If it's an adjunct, I need to know what special hours they need, because they work in industry. So maybe they can't be here during the day. If they teach somewhere else, they have to make sure their schedules mesh with our hours here. So those are the kinds of requirements I get from the department chairs.

Then I look at an overall master schedule, which I work on, to try to make sure that you're not going to have any conflicts. You don't want, say, a senior ChemE course conflicting with a graduate level ChemE course, because there may be some seniors in ChemE that want to take graduate courses. So we have to try to make sure that doesn't happen.

It's not always 100% foolproof.

The other thing is, in this building we have to be conscious of how many students are registering for classes because not every classroom has the same number of seats. So that's another thing I request from the department chairs: what are their estimates of how many students should be in a class. If it's a junior level required class, say, in EE, they'll know more or less how many students they'll have. If it's an elective, they may give me a range because then, when you're making the schedule, you also have to pair the time with an available room. On the fifth floor, 502 and 503 have 30 student limits, but 504 505 and 506 have 40 student limits. So it may be silly to put a class that may only have 12 in a room that can accommodate 40 students, and vice-versa. So that's another thing we have to look at.

It's like a big puzzle, putting all the pieces together. One of the major issues is Humanities. I also have to fit them into the schedule. I basically assign rooms in 41 Cooper Square. Foundation building [assignments] are under architecture [direction] and some are under art. Occasionally we switch back and forth, but I try to keep most of the engineering classes in this building, 41 Cooper Square.

It's a thing that evolves. For the Fall Semester, it evolves over the Summer. When they assign freshmen to a section in August, things may change. An adjunct may say, "Oh, I can't teach anymore" so we have to get a different adjunct and find if his hour mesh with where the course is already in place. So that's why it keeps evolving.

For the math classes, basically all the freshmen and sophomores take the same classes. For math electives, professors will usually indicate to me to make sure that it fits in the EE schedule, because they have some required math courses in their curriculum. And if those spots where we put it fit in for other students to take them, then that's it. Sometimes professor Agrawal will say to may, "well I have some students that want to take this but it conflicts, can we see if we can find another time?" We try to do that. Sometimes we'll put it at 8 in the morning, from 8 to 10 or 8 to 9, so there's never any conflicts because there are really no scheduled classes at 8 o'clock.

# Wolf: Dean Search Update

**Matthew Lee (ME '15)**
*Not Originally Printed*

**The Cooper Pioneer:** How long have you been Acting Dean?

**Alan Wolf:** I was appointed in the middle of last summer. What is the process for picking the new Dean of Engineering? We maintain confidentiality for the candidates, of course – I can't tell you who they are. The first interviews happened on April 1st and 2nd. All day we (we being the committee) met with candidates off campus, we interviewed about 10 people. that was the first round interviews. We reduced the list by about half, who we are continuing to evaluate. We've checked their references by phone. We are asking both references the candidates provided as well as references that we've identified (making sure the candidate is comfortable with our making contact with that second group!). We are gathering as much information as we can about the candidates. You might think that the references provided by the candidates will say only wonderful, glowing things about them, but we are asking some tough questions, and learning a great deal about this group of people.

We met last week and further narrowed the candidate list down to 3. We started with 9, we narrowed it to 4 by meeting with them, and from this we'll narrow it to something like 3, and those 3 will be interviewed again.

**TCP:** Who is on the committee?

**AL:** 7 members from Cooper's Faculty. It is 1 person from each department by election. Om from Mathematics, myself from Physics, Andrea Newmark from Chemistry, Cosmas Tzavelis from Civil, Toby Cumberbatch from EE, Stan Wei from Mechanical,Irv Brazinsky from Chemical. Another person helping us is Sheri Wills, an "ACE Fellow" spending the year at Cooper. Sheri is the person who coordinates between the Committee, the head hunting firm, and the President.

Two years ago we did the search ourselves – without a head hunting firm. We put ads in all of the journals, we got a number of applications, we weren't impressed by many of them. We did bring a few of the stronger candidates to campus, had lunch with them, and they gave technical presentations to the faculty. They gave good talks, but nobody was wildly enthusiastic about any of them.

We hired a head hunting firm this time, a company does nothing but these kinds of searches. We put out the ads again, but not a single one of the people who we interviewed responded to the ad s; all of our candidates this time were recruited by the firm. Many of them are deans at other schools (we have no internal candidates), they are geographically diverse. Most of these people have academic jobs, their institutions have no idea that they are on the market. There is a "gentleman's agreement" that if you are at an academic institution and you are going to leave it, you give your institution reasonable notice so they have time to search for a replacement. We are actually going to be beyond that deadline. Whoever we pick is going to be violating that gentleman's agreement, they'd be giving their institutions too little notice for a September start. We will bring the remaining candidates for a second round of interviews in the next few weeks, when they will have an opportunity to meet with various constituencies (other deans, other faculty, some students – perhaps the ESC, etc.). Even at that stage, we have to guarantee their confidentiality. Ultimately, President Bharucha will make the final decision as to who will receive an offer. Someone may be in place by the summer, by September, or perhaps, as late as January.

**TCP:** What kind of qualities are you looking for in the new dean?

**AL:** I'll give you some questions that we asked the candidates. All members of the committee recorded their responses to these questions. (NOTE: everything in the following brackets are the questions. I don't think we need to include all of them, but I don't know which ones sound more important to mention) [What are the principle things in your background that you believe to be of great value when you're applying for the position of dean of the school of engineering. We asked them to describe the size and scope of their administrative experience including the size of staff and budget. How did they describe their leadership style? Given your knowledge of cooper, what are priority areas in strategic planning? What is cooper's biggest challenge in the next 20 years? What did they think about some of the ideas the school of engineering has proposed for revenue generating. What experience did they have teaching undergraduates? How important has undergrad education been in their career? How would they increase the representation of women and other minorities in engineering? How would you work to increase ties with the Art and

Architecture schools? Do you have experience with unionized faculty, unionized adjuncts, and unionized staff? What have they done to build partnerships with industry? how have they worked to provide a more global perspective in engineering? What is their experience fundraising? How would they increase the visibility of the school of engineering? How would they envision the role of the dean in relation to the administration? What would they think of us partnering with another institution in the NYC area or elsewhere? ]

The committee as a group asked the same questions of all the candidates, we all jotted down our own notes; Jamshed interviewed each of them separately.

Some of these candidates were more prepared than others; some of them had read the expense reduction task force, some had read the specific 200 pages of proposals that engineering presented to the Board of Trustees in December.

**TCP:** What is the most difficult part of being dean that you want to share?

**AL:** There are endless meetings. They often run 3 hours long. I'm a fan of the "stand up" meeting style – where no one sits during a meeting. Probably our 3 hour meetings could be condensed to 45 minutes.

The toughest thing for me about being dean is the infinite number of tasks I'm called upon to do each day. I average hundreds of real (non-spam) emails daily, the majority of them require that I *do* something (besides responding to the email). So I am fixing grades, responding to entrepreneurs who come in with schemes to make cooper union vast sums of money, dealing with HR matters, and it goes on and on. At night, I'm called upon to introduce speakers and attend dinners. It is a vast amount of work, and I've been doing it in addition to teaching Mechanics, serving as Safety Coordinator, and so forth. I'm eager to get back to teaching and working on projects with students. I'm a perfectionist, and right now I'm doing so many things that I can't do them all as well as I'd like.

# April 23, 2013: The Day Cooper Charged Tuition

**Joseph Colonel (EE' 15) and Marcus Michelen (BSE '14)**
*Originally Printed in Issue #10.5*


At 6:05 AM on April 23rd 2013, members of the Cooper Community received a campus-notice email from Mark Epstein, Chairman of the Cooper Union Board of Trustees. The email was an invitation to an event at noon the same day, hosted by the Board of Trustees. According to the email, the event would "announce the decisions the Board reached on the future course of The Cooper Union for the Advancement of Science and Art." The 61-word email closed with a requirement: "No signs or banners please."

At the event itself, a lone podium stood before a packed Great Hall. At about ten minutes past noon, Mark Epstein walked in, and took his place behind the podium. He quietly read a written statement from the Board of Trustees: "The Board of Trustees voted last week to reduce the full-tuition scholarship to 50% for all undergraduates admitted to The Cooper Union beginning with the class entering in the fall of 2014."

He continued for approximately 15 more minutes, finishing the written statement that was subsequently emailed to the Cooper Community at 12:23 PM. Epstein then opened the floor for questions. However, instead of receiving questions verbally, Epstein insisted on receiving questions in writing. Men and women with large index cards walked around the Great Hall offering the cards to those who wanted to ask questions.

In order for one to ask a question, he or she needed to raise his or her hand, receive an index card, write down the question and give the card back to the carriers. The carrier would then give the index card to Epstein, who would put the card into a pile of questions to answer. As Epstein attempted to answer many of the questions, he ignored duplicates and questions he deemed antagonistic, as more questions came in.

A few of the questions along with Epstein's answers are reproduced below:

**Cooper Community:** "To avoid the consideration of charging tuition, how many millions of dollars would The Cooper Union need?"
**Mark Epstein:** "We would probably need a minimum of at least 300 to 400 million dollars."

**CC:** [Question unknown]
**ME:** "No, you are not getting a swimming pool."

**CC:** "What will stop an inflation [related] increase of the 50% [tuition]."
**ME:** "If you all would donate to this school, that will stop."

**CC:** "This format of asking questions is insulting."
**ME:** "Maybe so. Being yelled at, like the last meeting, was offensive so we're trying to keep it civil."

**CC**: "Me and my fellow students frequently say we wouldn't have chosen Cooper if it wasn't free. How will you attract students?"

**ME**: "Well, to tell you the truth: If people are coming here merely because we're free, we're doing something wrong. Okay. That should not be the main reason people come to Cooper Union. People should come to Cooper Union because they're serious about getting a great education. The fact that it's been tuition free is ... that's gravy on the ... uhh ... plate."

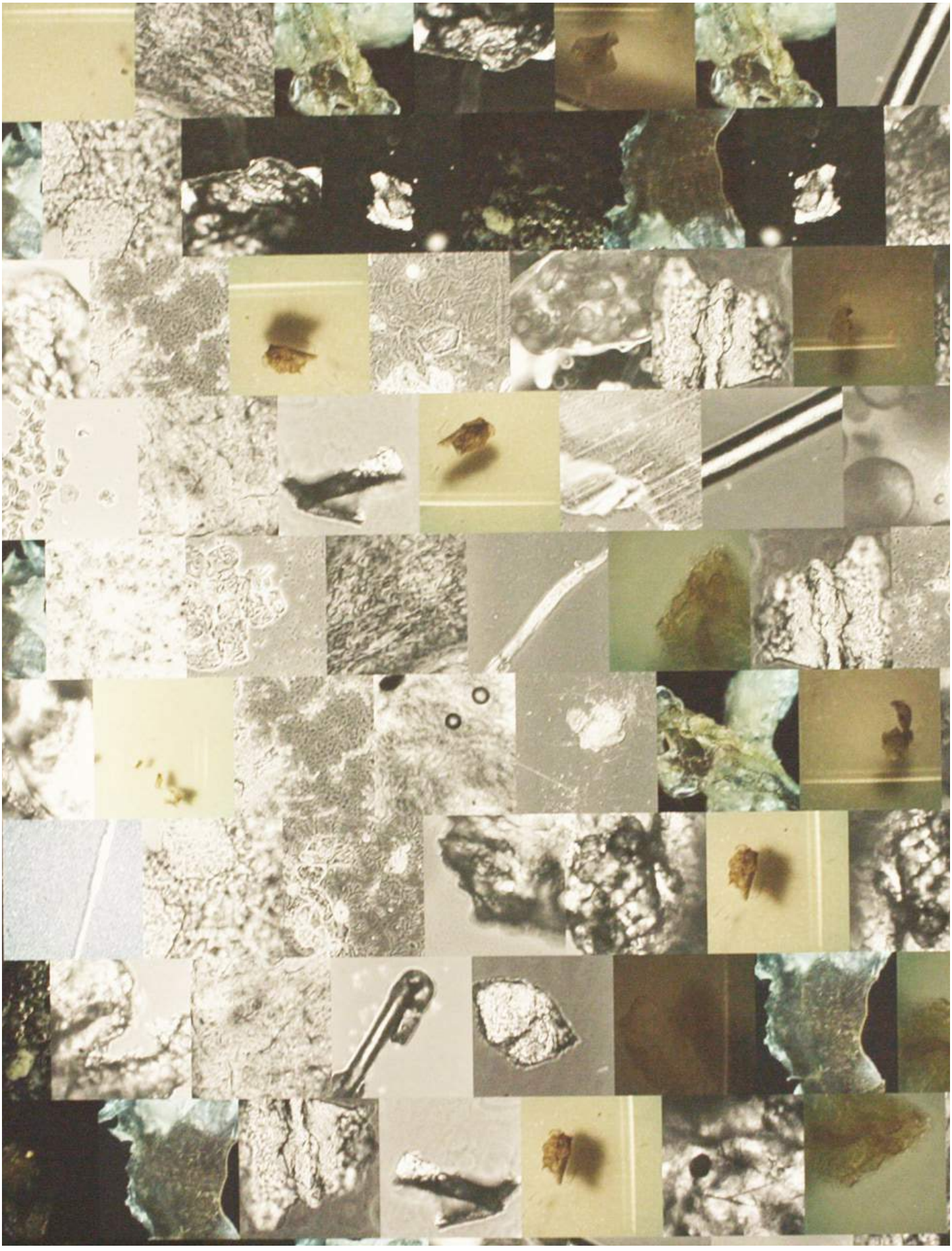
According to student Natalia Maliga, a walk-out was planned on Facebook, beginning a little after 2 PM. Beginning outside of the foundation building, the student-protestors entered 41 Cooper Square at approximately 3:30. The students walk up the Grand Staircase and stopped at the top the stairs, just outside of Frankie's lounge, chanting "Free as air and water!"

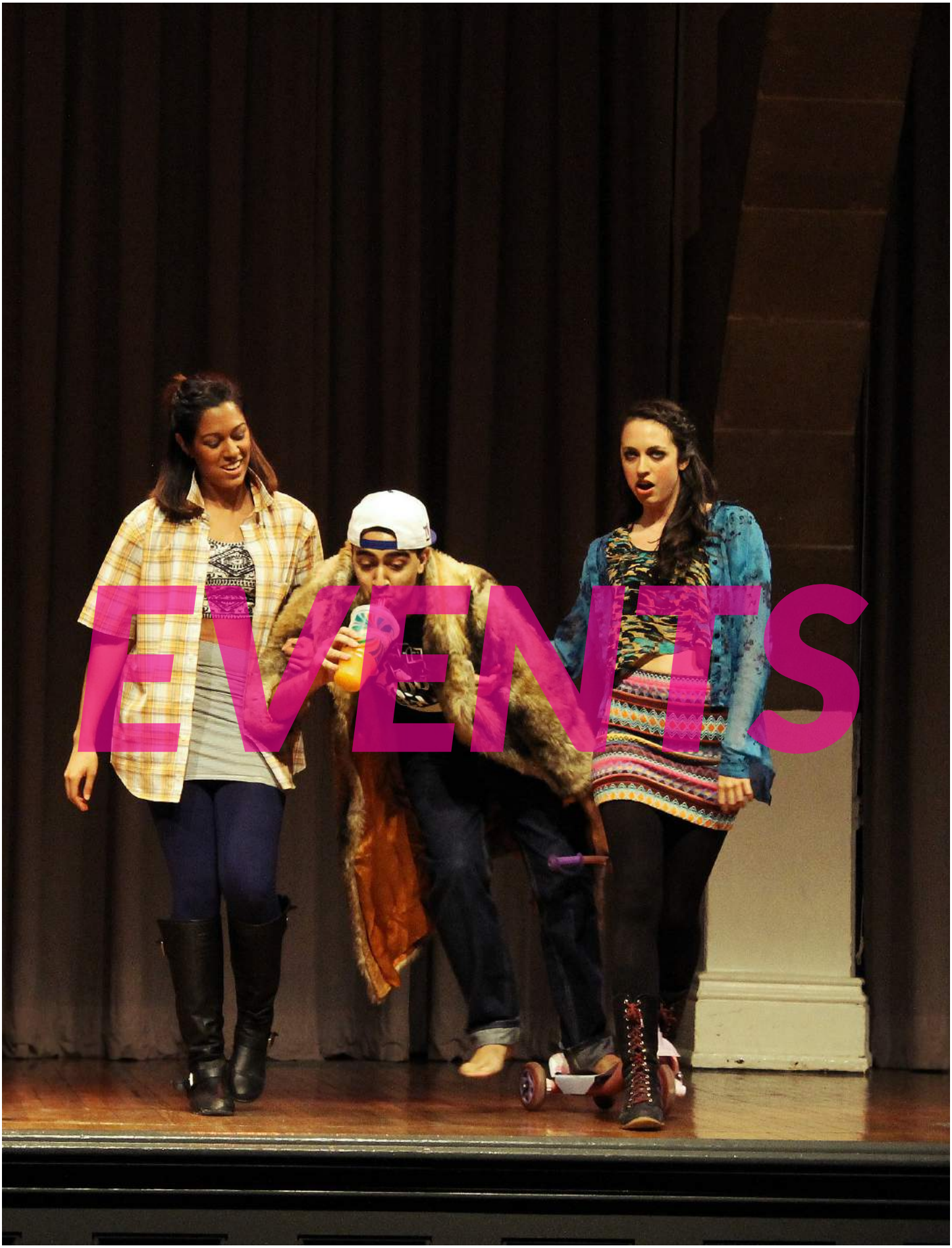
The group of students then began screaming and banging on the floor and walls of the school, attempting to get the attention of complacent engineers scattered throughout the building. The student-protestors went up to the 8th floor, calling for a unified school the entire way.

The movement walked back down to the 4th floor and stopped in front of Frankie's lounge, releasing another collective scream, reported to have been heard in the Rose Auditorium. The protesting continued outside of the foundation building for quite some time afterwards.

Near the end of the night, starting at 7:30 PM, a candlelight vigil with a small bonfire was held outside of the foundation building. Students of all three schools sat and stood around the fire sharing memories of their experiences at Cooper. The vigil ended when police peacefully asked the students to put out the bonfire. A student poured out the fire with sand from a fellow student's show.

*Photographs by Peter Ascoli (ME '15)*




EVENTS

# *Your Flu Shot Counts: Get One*

**Tensae Andargachew (ME '15)**
*Originally Printed in Issue #4*

On Monday, November 12, 2012, the Cooper Union offered students, faculty, and a staff a free flu vaccination, attempting to entice the community with a chance at winning an Amazon gift card and the opportunity to throw a pie at Dean Wolf's face. Although the latter was only allowed should 60% of the Cooper population get vaccinated, which we failed to accomplish, an estimated 230 people (roughly 25% of the school) got the flu shot that day. An additional 70 people had also received a flu shot, either from Cooper's October flu shot program, or from CVS, Walgreens, or their family doctor, meaning that for all intents and purposes approximately 30% of the school has received the 2012 vaccine.

What does this mean for the Cooper community? For starters, almost 1 in 3 people we meet in the halls, on the staircases or in the Foundation Building will have been vaccinated. So suppose there was an outbreak of the flu in the school. Dean Wolf provided a computer simulation, written by Shane Killian and modified by Robert Webb, whose work has been featured in PC Plus Magazine, written to mathematically model what might happen in the case of an outbreak. I ran a simulation with 30% of the population inoculated, to see a possible outcome:

At the end of this simulation, 99.63% of the people who were not vaccinated got the flu, while 50.58% of the people who were inocculated got the flu. Of course, this is a very general stochastic mathematical model, which may not be the most accurate model of what might happen to our institution, should there be an outbreak. The model assumes a population of 800 while our population is closer to 1100. This model also seems to assume complete and total interaction of the population, which is not necessarily what happens to the extent the model presumes.

Moreover, the model also seems to assume that the people who are vaccinated are randomly dispersed throughout the population. However, the data suggests otherwise – 22% of the students of the School of Engineering received the vaccination, while 18% of the students from the School of Art and 20% from the School of Architecture did.

This model may well be a best case scenario for the school, which should be a very sobering fact. Had 80% been inoculated, we would have reached "herd inoculation" which would have protected almost all of us.

However, there is one thing that this simulation does tell us which is unfortunately even more dour – the flu virus is an incredibly contagious disease.

This year's vaccination tackles three different strains of the virus – one influenza A H3N2 virus, one influenza A H1N1 virus (swine flu) and one influenza B virus.

All three are particularly nasty and someone getting one of these during the school year, introducing it into the school would not bode well for many of us. Many people don't appreciate the difference between the common cold and the flu. Flu symptoms are often much worse, and can last for up to two weeks.

There is however at least one good thing that did come of this: those who were vaccinated have a reduced chance of getting the flu, as will the people they associated with, according to some studies. Also, if you are vaccinated, and still get the flu, your symptoms are likely to be less severe. Still, despite the extended hours for getting a flu shot and the relative ease of getting a shot – at best roughly 30% of the school is vaccinated. What might be attributed to the low turnout?

One possibility is that the hours did not work for all students. And while it is true that the School of Art, School of Engineering and School of Architecture have different hours, it seems unlikely that ten minutes could not be spared by more people. Dean Wolf believes that, in part, the low turnout was due to some misconceptions that students have about the vaccination itself.

As he went around the school on Monday night, advocating all get the flu shot, he had encountered some students who believed that because they ate healthy and exercised regularly, the flu shot was not necessary. Some believed myths about the flu shot – such as that it gave Alzheimer's or autism. None of that is supported by medical science, for the record.

There is another possibility, and it is the case with so many other times in life – people figured that "everyone else will do

what needs to be done (get a flu shot), so I don't need to. But failing to get a flu shot because you believe others will is free riding on the sanitary responsibility of others."

The numbers from this round of flu vaccinations at Cooper do not indicate that to be a safe bet at all. The safest, and wisest, thing to do is to get the shot because you will be protecting your health and the health of others.

# *Cooper's Sandy Relief Efforts*

**Caroline Yu (EE '15)**
*Originally Printed in Issue #4*

Hurricane Sandy has been the talk of 2012 fall season. Sandy brought many inches of rain and, in some areas, snow, but was most destructive in coastal regions where there were storm surges 9-12 feet above normal. From stories of despair to inspiring stories of community building, Sandy has helped many people identify what things are most important in their lives.

To help the New York City residents who need the most aid, students, faculty, and staff at Cooper have gone above and beyond in efforts to restore communities. Below are some of the many ways Cooper's various clubs and individuals took part in Sandy relief efforts.

The Society of Women Engineers, Intervarsity Christian Fellowship, and Hillel Cooper collected donations for New York City Urban Project's Feed500 relief effort.

Students prepared and distributed necessities to affected areas, shelters, and relief organizations. Not only was this an inspirational gathering of volunteers, individuals connected with other individuals affected by the storm who had the same strong spirit and motivation to rebuild and recover quickly.

For an entire week, the Origami Club made everyone getting onto the elevators or going up the Grand Staircase stop in awe of origami creations. Suggested donations and auctioned off pieces raised a little less than $2000.

Zeta Psi organized a pie throwing contest to raise money. A food and clothes drive was also organized where all proceeds were donated to the Red Cross.

Intervarsity organized a sock drive to collect socks for those still in the dark or without shelter.

School wide events included a relief breakfast where Zeta Psi organized a pancake breakfast that lead everyone to Frankie's and a benefit concert where the Coopertones, CooperNova, Sons of Pitches, President Bharucha and other Cooper musicians preformed.

# How Do We Look? Scientific Photography

**Jenna Lee (ME '15)**
*Originally Printed in Issue #5*

An old adage claims that "everyone is an artist", but is it really true?

This year's exhibition, "How Do We Look?" shows an attempt to use science and technology as a foundation for art by engineering students in last semester's Scientific Photography class. Can photographs express motions? Time? Right next to the entrance of the exhibition, Michael Pimpinella's (ME '14) work asks these questions to the audience. Against the preconception that photography is a static art form, students including Ferdy Budhidharma (ChE '14), Joann Lee (ChE '13) and Eric Leong (ME '14) toy with time and the photographic medium.

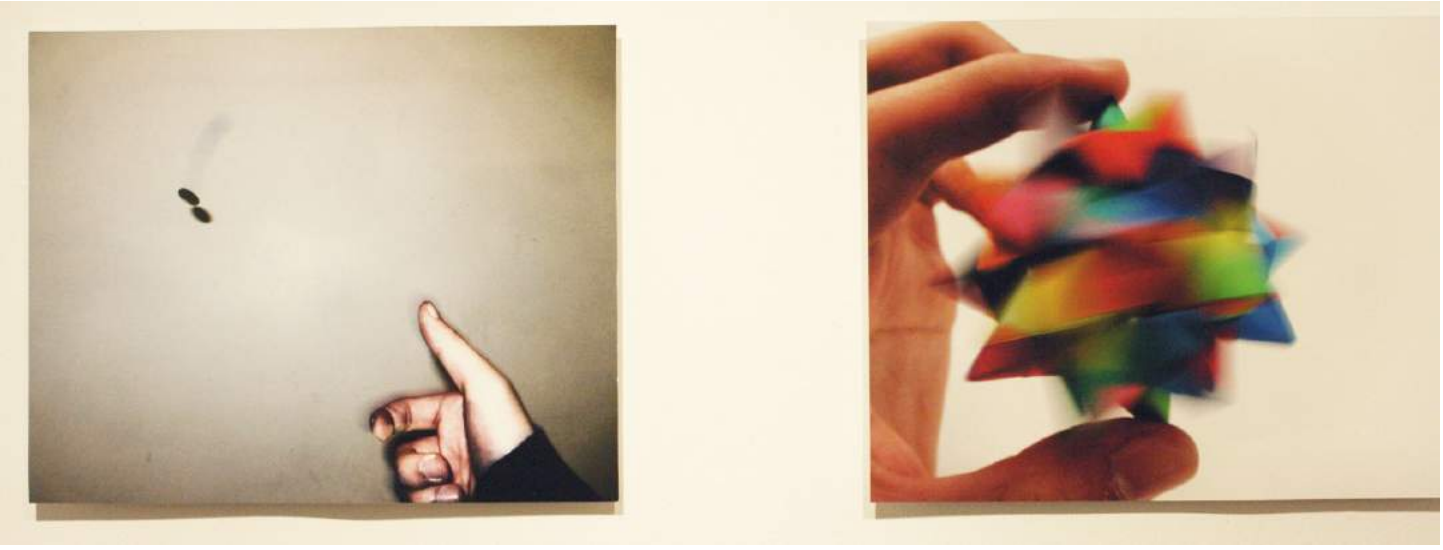
Their work has the theme of motion and time in common, skillfully depicting the lapse of time in a single snapshot. Some raises more fundamental questions about our perception of the world: Mindy Wong in work identifies herself using a collection of magnified images of her hair, skin and other parts of her body.

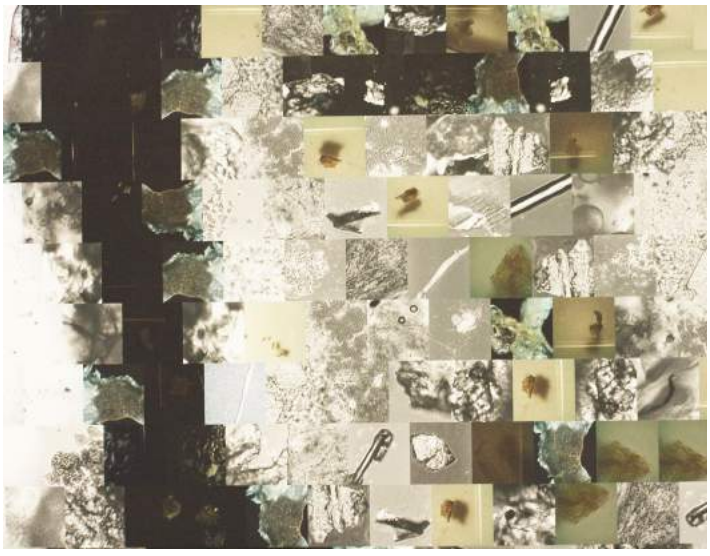
Robert Yankou (ME '13), on the other hand, questions our understanding of "color", as it is mathematically displayed using a limited, discrete set of numbers.

William Biesiadecki (ME '14) questions how reliable our memory is, comparing human memories to evanescent ripples on the pond.

Elizabeth Kilson (EE '14) tries to get the closest view on animals using her camera, offering a different look on the small creatures we run into every day. There are also explorations on technology of photography, as Uyên Nguyen's (ME '14) holograms, or Victor Chen's (EE '13) attempt to abandon normal flat images and to see the world in a different angle, a distorted, fish-eye way.

All in all, the exhibition shows that engineers can also be great artists, raising similar questions as artists do, only using more scientific tools such as microscopes and infrared lights. Would it be a mere coincidence that Joann Lee's pictures strikingly resemble Magritte's The Empire of Light?





*Photographs by Jenna Lee (ME '15)*

# A Free Institution: The December Protest

**Tensae Andargachew (ME '15)**
*Originally Printed in Issue #5*


On June 17, 1858, Abraham Lincoln made the argument that "a house divided against itself cannot stand", arguing with passion that all people must be free. Two years later, he would give a speech at Cooper Union, where he spoke with passion again, dedicated to the cause of a free man, at a school dedicated to a free education.

Fast forward 150 years: Cooper Union is a school in torpor, financially at first, putting in jeopardy the free school.A new president, President Jamshed Bharucha comes in to solve the crisis at hand, and exposes all the details to everyone. The Cooper community finds out that Cooper is running on massive deficits and has a good deal of debt, therefore something must be done to keep the institution solvent. Immediately, committees were put together, taxes were released, and talks between all sorts of people in the Cooper community were held.

After listening to the talks, reading the reports and discussing options – one fact was revealed: tuition was on the table as a last resort. Time passed by, but the situation appeared to be growing more dire, which has led to tense relations between some in the community and a series of protests.

The latest in the series of protests began on Monday, December 3 – students, faculty, alumni and general members of the Cooper community attended in an effort to express their strong opposition to a tuition based plan, with red banners flowing and posters reading "Debtaster Zone" and "Free".

In the communiqué distributed, there are three demands made by the protestors: a commitment from administrators, affirming that they are committed to a free education; reforms in the Board of Trustees proceedings – in particular, a call for more transparency; and lastly, the resignation of President Bharucha.

The first two points were elaborated on in the communiqué. However, an explanation as to why the protestors demanded Bharucha's resignation can be found elsewhere: in a leaflet distributed at the protest, written by Casey Gollan, a senior art student enrolled here at Cooper.

It is suggested in this leaflet that the president came in with an agenda, which is in direct conflict with the mission of Peter Cooper – symbolized throughout the day on Monday with carts clashing into each other, into cardboard tombstones, symbolic of Peter Cooper.

This leaflet asserted that the agenda that the president supposedly holds has not been forfeited in any way, and further went to on to claim that the president uses boilerplate and the police to solve issues.

This view, in particular that the president has had an agenda in store is not unique to only Casey, but was shared by many at the protest, though not everyone. Mia Eaton, the wife of a tenured art professor, also shared that view, and believed that tuition is selling Cooper's reputation, redefining its mission, and for this reason, it should be closed.

She explained to me how the students who barricaded themselves in the Peter Cooper Suite (or referred to by many in the media as the Clock Tower), were (and still are) risking everything – arrest and expulsion being the biggest two – for this cause.

While the protestors, whether in the suite or not, continue to protest things that might be voted on, the general plans for the future are vague – all that is really understood is that the solution must not include any tuition. Asher Mones, an art student who attended the protest, said that its really up to the administration, those committed to the mission of no tuition are who should decide. Some distributed copies of The Way Forward and bullet points as to what possibly could be done in an effort to solve it, but an official comprehensive solution was not endorsed.

Tuesday, President Bharucha addressed the protestors while ensnared by them, in the lobby of 41 Cooper Square. He repeated all the facts, told them what was going on in current talks with everyone, and then offered the protestors to join him in the Great Hall to discuss matters further. A little later, a group of students had come to praise Bharucha, affirming that they believed that he was committed to the school and its mission. This prompted a debate between the students protesting and the students praising Bharucha.

The Cooper community is in for some more talks, debates, forms and forums throughout this ongoing the crisis. Details, opinions and plans will eventually be made clear with the vehicle of free speech. The atmosphere at Cooper, which has been set up to debate ideas and not to debase individuals, to verify facts before vilifying opinions, promotes free speech, and more generally freedom. And it has done so ever since the days of Lincoln. With the freedom to express ideas and the ingenuity of the community and everyone somewhat ready to band together and embark on a road to solve Cooper's crisis, the best way forward will probably be found.


*Photograph by Jenna Lee (ME '15)*

# Silent Protest on the Grand Staircase

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #8*


At 12:30 in the afternoon on March 6th, students from The Cooper Union came together to sit on the Grand Staircase. The original plan was for the student body to meet on the grand staircase and then move to where the Board of Trustee's mythic March meeting was taking place. According to a Facebook post advertising the protest, "The protest will be non-violent and completely silent, but it will be an opportunity to show the board that we can stand as one whole in support of our school."

At 12:35, the protestors turned completely silent. The Grand Staircase was entirely covered in students, save for a small aisle to allow the occasional passerby to walk down. There were far too many students there to count. Every whisper seemed loud enough to be heard as passersby stood around in the lobby. Students were walking around on the fourth floor, taking pictures of the protestors. From the second floor, the sound of each of these shutters clicking was very audible. It was a deafening silence.

A few minutes later, student Pete Halupka, an organizer of the event, singled out each of the three majors and asked all students of that major to raise their hands. The representation from each of the three majors was fairly even. He then asked that all students raise their hand, in an effort to show that our majors are merely a superficial boundary we must conquer.

Halupka then informed the silent protestors that the Board of Trustees meeting had been moved to an off-campus location, and that this is the first time that such a meeting has been moved off-campus.

Another student, Caleb Wang (EE '13) spoke briefly about the planning of the silent protest and explained that the differences in opinion between students can only be a good thing, and encouraged interdisciplinary discussion and civil debate.

Near the end of the protest, a student stood in lobby and asked the protestors to raise their hand if they agree with the mission statement of the school as it is currently written. Nearly every protestor raised his or her hand. He then asked if the protestors agree that "an injury to one is an injury to all." Again, nearly every protestor raised his or her hand. This was followed by applause.

Wang spoke a few words before the protest ended, again encouraging inter-major discussion and debate as Halupka wrote "We Care" on pieces of duct tape that he handed out to the protestors.

The event ended a little before 1 pm.

*Photographs by Peter Ascoli (ME '15)*

# Cooper GLASS's First Drag Race

**Josephina Taylor Conquistadora (EE '15)**
*Originally Printed in Issue #9*

*Photograph by Jenna Lee (ME '15)*

On Thursday, March 29, Cooper Union's GLASS (Gay Lesbian and Straight Spectrum) club held a drag race in the Rose auditorium, and we ain't talkin' bout no cars Miss Thing.

The anticipation was mounting as the minutes ticked by. Hercules and Love Affair played through the speakers of the Rose Auditorium, failing to satiate the appetite of an audience that filled nearly half of the space.

A picture of RuPaul, drag queen extraordinaire, shined on the projector and smiled upon the artists and engineers waiting for the show to begin. The music stopped, and the audience began to shift, itchy. It was supposed to start at eight, right?

A petite Asian girl came on to the stage and clumsily made her way to the podium, wearing a form fitting grey dress, black leggings, heels, and a blonde bob with fierce bangs. The audience erupted into applause, some stamping, some brought nearly to tears with laughter.

The girl flipped her hair, put a hand on her hip, and introduced herself: "Hi everybody, my name is Lulu Lemon, and welcome to Cooper Union's first ever Drag Race!"

Emcee Lulu Lemon, four drag queens and one drag king, all sickening, left an audience that filled half the Rose Auditorium gagging on their eleganza. Lulu Lemon, Rosie, Erika, Benedick

O. Steele, and Harry Vagina stomped the stage, kicking off the drag race with a runway walk to RuPaul's "Cover Girl (Put the Bass in Your Walk)."

Events of the night included a literal race around the Rose Auditorium, a lipsync to Carly Rae Jepson's "Call Me Maybe," a group twerk to Azealia Banks's "212", and a pole dance. There were more than a few standout moments: Erika, serving up middle aged Asian mama realness, conquered the lap dance competition, leaving Benedick O. Steele covered in lipstick; Rosie's flawless harassment of the audience, complete with winding and grinding on the mainstage; Benedick O. Steele giving all the queens a turn.

Most impressive, was Harry Vagina's multiple surprise wardrobe changes, transforming her outfit from red carpet couture to daytime drag to Kinbaku swimsuit fierceness.

After all was said and done, the audience voted Harry Vagina as the winner, who won an Amazon gift card. The night was great fun, a welcome change from the doldrums of an often busy and flustered existence here at Cooper. Many look forward to the return of the Cooper Union Drag Race in the upcoming academic year.

# "Culture Central" 2013

**Yara Elborolosy (CE '14)**
*Originally Printed in Issue #10*

On April 6th, hundreds of students filled the great hall for the annual culture, run by the South Asian Society. Sponsored by Dean Baker, the culture show demonstrates that Cooper Students can bring more to the table than their intelligence. The emcees for the night were once again Marcello Ricottone (ChE'14), Jonathon Ostrander (ME'14), Alexa Reghenzani (Arch'15), and Sharang Phadke (EE'14), entertaining the crowd between every act. The night started off with Poco a Poco, an instrumental group that just started up this year. They broke up their act into two parts, the first part composed of tubas, trombones, and trumpets while the second part composed of the string instruments. Playing classics that most of the audience recognized made the act a great way to start the night. Next up was SAS Girl Dance, a recurring act that manages to be different every year. They danced to a mixture of contemporary upbeat Bollywood music, which made the act enjoyable to listen to and watch. Afterword, the Cooper Union Breakdance club performed with some new recruits including, for the first time in my last three years here, girls.

Professor Lepek once again awed us by playing a classic on the piano, filling the great hall with beautiful music. Ballroom dance club danced elegantly, showing off their Argentina Tango and Salsa skills. Chinese Yo-yo, an act that started off as a one-man show, evolved into an eight-person group during the culture show. This allowed for many amusing tricks, such as passing yoyos to each other. To end the first half of the talent show, SAS performed the guy's dance, which was just as wonderful as the girl's dance. Once again, they picked upbeat music and kept the crowd in good spirits. After a fifteen-minute intermission, the culture show started up again with the Cooper Union Gospel Choir, a singing group that just started up this year. Singing with beautiful, strong voices, Gospel Choir had the entire audience joining in, either by encouraging spectators to clap to the beat or sing along. Afterwards, CooperNova, another group that also just started up recently, entertained us with their dance moves. Dancing to songs from all over, CooperNova integrated cultures from members of their group into one great performance. Sons of Pitches, a male acapella quartet took over after CooperNova. They sang two songs, one more well known then the other, but did a wonderful job with both songs.

A new act performed by Mary Madison Mazur (CE'15) was up next, an Irish step dance called Kilkenny Races, a unique and wonderful act, showing us a great dance we may have never seen elsewhere. Coopertones came up next, our very own singing group. Celebrating their last performance with one of the senior members of the group, Coopertones sang beautifully as always.

The dombra, a two stringed lute from Kazakhstan was played beautifully once more. Playing two well-known songs, Diana Yun (Art'13) filled the hall with elegant musical notes.

Chinese Student Association (CSA) performed a Chinese cultural dance, similar to the one performed last year. Their Chinese cultural dance fused ribbon and fan dance together with great light effects to create a beautiful performance. Last but certainly not least was the SAS group dance. Group dance was a very upbeat and fun performance to watch, made even more enjoyable was the reaction the audience had when President Bharucha came out during the Group Dance and joined along. Ending the night with delicious food that, Culture Show 2013 was an amazing event. The unsung star of this year's culture show was its integration of the three schools, across all years, into its acts.

This year was a shining example of how much better the performances will be because of it. If you missed the Culture Show, be sure to check out the videos all over Facebook.

*Photographs by Joann Lee (ChE '13) and William Biesiadecki (ME '14)*

# Collaborative Banner Unveiling


**Excerpt from Opening Speech, Caleb Wang (EE '13)**

In light of the announcement made one week ago, the engineering student body has met twice to discuss what our response to the Boards' announcement should be. Obviously, people have a variety of opinions, but the overwhelming consensus was that something had to be done. The Cooper Union we knew one week and one day ago is too important to simply let fade while we spend our time studying for finals, working on projects, or whatever it may be. As an engineering student body we are planning various student actions to express the value of our school to each other, the New York City community, and the world. I am here to tell you about those actions and more importantly how you can be involved. The first of the student actions we planned was raising a banner on the New Academic building. We wanted it to compliment the "Free Education for All" banner that hangs on the Foundation Building, while expressing our own perspectives on the situation. We wanted the banner to encapsulate the mission and culture of the school. As you probably now know, the banner reads "Designed for Free Education" which we determined to be the most accurate expression of our feelings after lots of thought and collaboration between students of all three schools. I'd like to give a huge thank you to everyone who worked late into the night to make the banner happen.

The second student action intends to publicize the culture and environment that exists at Cooper on the web. We want it to be concise and easy for people to understand so we decided to make a website that tells the stories and displays the work of Cooper Union students and alumni. The URL for the website is whycooper.org. This is the first big way you can help. We need people to submit stories and projects that demonstrate the culture of our school and why its special. You just go to whycooper.org then log in with your Cooper ID and you can submit text, photos, and video. We want everything from freshmen DLD projects to 5th year architecture thesis projects!

The second thing is that as an engineering student body we wanted to organize a press statement with a similar goal as the website but geared towards the community of New York City. The way we want to do this is by having a press statement at City Hall. We will be meeting next Tuesday May 7th at 12 PM on the stairs in the NAB then taking subways down to City Hall. The press statement will be comprised of two parts. There will be 3 or 4 speeches submitted by the Cooper community as well as student projects that we will bring down to City Hall. Anyone who is part of the Cooper community (faculty, alumni, students, etc) is eligible to submit a 5-7 minute speech to whycooper@gmail.com. We ask that the speeches are focused on expressing the culture and uniqueness of our school in a way that is accessible to the general public. The organizing committee will select 3-4 of the speeches that best represent the goals of the event and those people will deliver them on Tuesday. We will be inviting the media in hopes of making the value of the Cooper Union clear to the larger public. The biggest way you can help out with this is by coming. The more people that are there the larger the voice our speakers will have. Related to that, invite your friends. The last way you can help is to bring your projects. We would love it if reporters had the chance to interview students about these awesome projects and pieces that they are working on. There has been a lot of press coverage about tuition and the financial situation, but there hasn't been a lot of coverage about what the students actually do here and how that makes the institution special. So to recap, write speeches, come, bring projects, and invite friends.

**Excerpt from The Cooper Address, Michael D'Ambrose (MChE '14)**

There are not only two alternatives to this problem that has been thrust at the very feet of The Cooper Union. The world is not black and white, but rather so gray that the lines have been blurred to nearly non-existent. So do not think that we have to acquiesce to what the Board of Trustees has told us and give in to partial tuition or the closing of certain aspects of the school. No, I say! We can work hard as engineers, artists, and architects, pragmatically, creatively, and meticulously just as we have for every assignment entrusted to us within the walls of this hallowed institution. We are not a college, we are not a university. We are a Union! We shall unite and thrive and sustain the vision of Peter Cooper by working harder than we ever have and uniting. Cohesion, transparency, and respect among classmates in the engineering, art, and architecture schools are paramount. I ask only for you to give your signature on a petition stating that you support the cause to maintain Peter Cooper's vision of offering the opportunity to receive a world-class education to all based solely on merit and nothing else! Tuition will not be charged to the class entering 2014. Not if we all work together. We can act selfishly and say "well at least I got out for free". Or we can take responsibility for future generations, for our children and our children's children, and make sure that Cooper Union remains tuition free forever and ever!


*Photographs by Peter Ascoli (ME '15)*

# EDITORIALS

# Out on a Limb Where There Should be a Bridge

**Joseph Colonel (EE '15)**
*Originally Printed in Issue #5*


*Photograph by Jenna Lee (ME '15)*

"That's a valid argument, that's not what they care about. That's not how they think.

"We can't have a conversation like that. They get heated."

"Look at them, how they can get away with doing that for three days."

"It makes me mad, I have so much work to do. They're not doing anything. #artists #assholes"

These are a few of the comments I've heard made by students in the New Academic Building regarding the people protesting inside the Peter Cooper Suite and the people supporting them in front of the Foundation Building. That these comments have been lifted out of context is irrelevant. To a passerby these statements seem inflammatory, divisive, and ignorant. It is surprising and upsetting to hear such words come out of the mouths of students attending one of the top undergraduate engineering colleges in the country. It is disturbing and disappointing to hear these words spoken by my colleagues and peers.

These types of statements spewed from "both sides of the issue" embody a more startling trend I have noticed since entering the Cooper Union last fall: engineering students disregarding the opinions and intellect of art students. Discourse and collaboration between the Art, Architecture, and Engineering schools cannot happen until students abandon this type of rhetoric and attempt to uphold mutual respect and understanding for their peers.

The time for sarcasm and jokes in legitimate discussion has long since passed. Whether or not it ever existed I leave up to you. We as students owe it to one another to uphold a policy of honesty and transparency in conversation, both face to face and online, should we expect any sort of exchange of ideas or collaboration to exist between students.

Shouting across the lobby of the New Academic Building at one another or putting up posters that mocking claim that we can summon the ghost of Peter Cooper who will shit out enough money to solve Cooper's financial troubles should we wish hard enough do nothing but strengthen the bi-partisan trend overtaking the Art and Engineering schools.

As said by Kurt Vonnegut, "We are what we pretend to be, so we must be careful who we pretend to be."

Healing this apparent divide between the Art and Engineering schools begins with the recognition that anyone you talk to or talk about is a human.

Like you, these people were conceived in some manner, and have spent the entirety of their lives on or near the surface of the Earth, where they have grown up and accumulated life experiences that have shaped them into the people they are today. Referring to the people in the Peter Cooper Suite and those supporting them outside the Foundation Building as "the artists" is not only fallacious but also dehumanizing. As one person told me, "We shouldn't let our interests define us. I'm a Cooper Union student before I am a Cooper Union Art Student."

On the topic of Cooper's Future, that same person went on to say, "It would be unfair to expect everyone to think the same." In a time where the future of our institution is uncertain, it is ludicrous to believe that everyone will come to the same conclusion as to how to protect it. Respect these opinions, for that is all they are: opinions.

Engineers, artists, and architects are all creators based around certain guiding principles. Engineers typically design with practicality and efficiency in mind. Some artists may create in the name of aesthetics or provocation. Some architects design in the name of progress. It must be recognized by everyone that each of these disciplines has its merits and its place. By no means should any be belittled; these differences should be celebrated and explored by each party individually. Some may see how a wider scope during the creative process can produce beautiful results.

I applaud the action taken by Unify Cooper Union, a group created by Rob Brumer (ChE '14) and dedicated specifically to generating interschool dialogue and collaboration. The group hosted an event named "Common Ground," held on December 6th. The event was created by Brumer and hosted by Caleb Wang (EE '13). The Facebook page for the event states:

"As artists, architects and engineers, we all love our school. When things get heated it is hard to remember we all have that in common. This event is about trying to understand each others' perspectives by getting to know one another and why we are passionate about what we do.

"We will do this by splitting up into small groups of 5 or 6, ideally with at least one person from each school in each group. After a brief introduction from representatives from all three schools, the groups will go through the studios, classrooms, and labs to collaborate about the engineering, art, and architecture projects that we are all working on."

The event received nothing but enthusiasm and praise from those that attended. Talks of student-run courses and lectures to be held for students from all three schools have been met with the same response. I hope that this movement pans out, and that it is not simply a moment of clarity to be lost among the commotion of daily Cooper life.

Everyone has the well being of the Cooper Union at the bottom of their hearts and the forefronts of their minds, of that I am certain. Hopefully a revised rhetoric will allow more fruitful dialogue to exist between all members of the Cooper community.

# *Call Back Your Tanks*

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #7*

*Photograph by Jenna Lee (ME '15)*

On Friday March 1, 2013 a few members of the Board of Trustees, along with President Bharucha, spoke before the Cooper Community in the Great Hall. We were treated to a brief history lesson from trustee Michael Borkowsky (ME '61), followed by a Q&A session. The first batch of questions came from a cache of roughly 120 questions that were submitted online by various members of the Cooper Community. The second batch of questions was asked by members of the audience. These questions were moderated by trustee Edgar Mokuvos (EE '78). Also present from the Board of Trustees were Don Blauweiss, A '61; Raymond Falci, ME '86; Thomas Driscoll, ME '77; Francois de Menil, ARCH '87 and, of course, Mark Epstein A '76.

These seven members of the Board of Trustees took their seats at 6 PM, almost exactly on the hour. President Bharucha wasn't there at first. Something felt very off. There are a lot of members of the Board of Trustees, presumably with a fair amount of diversity. Why, then, would they pick seven, white men with glasses in their forties? At the risk of sounding exceedingly snarky, the panel bore more than a passing resemblance to Statler and Waldorf, the grumpy millionaires of The Muppets.

I was not the only one to notice the homogenous group of men that sat before the hungry audience; at the forum, Professor Atina Grossmann of the Humanities Department said, "Never have I been confronted with a podium that is so entirely male." Mark Epstein responded, with the right amount of humor and self-consciousness, "we're well aware that we're too male and too white."

I don't bring up the lack of diversity for the sake of a cheap joke and obvious reference. Clearly, there must have been a reason that these seven were selected, especially since a female member of the Board of Trustees sat in the front row of the audience, not a member of the panel. Looking at the list of Trustees on cooper.edu (cooper.edu/about/trustees), we see 22 names listed, including Jamshed's. Of these 21 (I omit Jamshed), eleven have degrees from Cooper Union. All eleven are male. The members of the Board of Trustees who spoke on March 1st were all male, yes, but more importantly, they all have degrees from Cooper.

I'm sure many of you are writing this off as a mere coincidence already, so I did a little bit of number crunching. Let's assume that the seven members were chosen randomly from the pool of 21 names; the odds that all seven members chosen were Cooper graduates are approximately .284%, less than 3 in 1000. To me, this shows that these men were chosen largely because of their direct ties to the Cooper Community.

It's no secret that we as students and faculty members have alienated the Board of Trustees. In their own way, I think this choice of having Cooper grads speak is a very well-intentioned attempt to connect with the fairly intimidating Cooper Community more.

Demographics aside, the forum was quite typical. Many fantastic questions were asked, a few repetitive questions were asked and, as expected, Professor Sohnya Sayres calmly and elegantly explained the beauty of the meritocratic nature of Cooper Union. Most familiar, perhaps, were how the members of the Board dodged and avoided questions.

The members represented did not take any kind of responsibility for mass deferring of the Art school's class of 2017, they failed to tell us when real decisions will be made (they have told us that March 6 is an important meeting, however) and, in some cases, the members simply dismissively disagreed with points raised. For instance, a student brought up the lack of transparency in the Board of Trustees and Thomas Driscoll simply responded with "I think there's been a very transparent process."

What else were we expecting? I joked before the meeting that the best case scenario would be the announcement of a large-scale gift and that the worst case scenario would be the announcement of the closure or implementation of tuition at any of the three schools. We didn't get either of those, clearly, but frankly we didn't gain any substantial information at all. Which naturally brings to mind a more complicated question: why even hold this meeting in the first place?

We'd all love to believe that the Board of Trustees would like to the hear the opinion of the community before making any dramatic decisions, but it's a little bit late for that. The Board is well aware of what the community feels about nearly everything at this point; I don't know how much that affects the decision that they will eventually reach, but at this point it would be outrageous if they didn't know how the community feels. Given the sheer lack of new content that appeared during this meeting and the choice of all Cooper graduates, this seems like an attempt to reach out to the community gone wrong.

In retrospect, nothing else could have really happened. We're at the point in time where we, as a community, cannot influence the Board's decisions. All we can do is wait. In lofty terms, this meeting was a form of anagnorisis: the moment in a Greek Tragedy when the tragic hero is suddenly made aware of his fate. While it may be a reach to compare the troubles of the Cooper Community to a hero in an Aristotelian tragedy, this meeting was nothing but a severe kick back to reality. It was the time we collectively realized that this is really happening. Just like the classic Greek Tragedies, there's nothing we can do about our fate. Whatever happens at this point is completely out of our control.


The only thing we can do is attempt to reach out to the Board of Trustees. Regardless of what happens to the Cooper Union, every single person in the Cooper Community can only better from more secure and real connections between the Board of Trustees and the rest of the community. We've tried to reach out to Board on numerous occasions; many of the questions that students presented before the Board on March 1st were strictly about improving relationships between the Board and the Cooper Community. I know it's a cliché to say so at this point, but the Board is not reciprocating our effort.

As a community, we have to keep trying. March 1st was a day where we tried very hard to reach out and the Board simply gave us nothing. When Professor Sayres beautifully described the appeal of Cooper Union, she stood before the Board of Trustees in an attempt to communicate she believed they did not understand. A friend of mine took a screenshot from the live stream when she was speaking to the Board; the results are quite poignant.

We see our Sohnya Sayres standing before these power-tie wearing gentlemen. This photo encapsulates the clear and apparent barrier between the Board of Trustees and the Cooper Community, a wall both parties lent a hand to help erect. Visually, it bears much resemblance to the iconic photo of a man standing alone before a column of tanks in the Tiananmen Square protests. It is all too easy to demonize the Board of Trustees as a vaguely fascist, imposing and mechanical group of scary men in suits. We must move past this. These were Cooper grads we met with. They aren't an extension of the Community; they are a part of the Cooper Community.

There's room on both sides to try harder. Somehow, we need to improve our image of this collection of people. In turn, they need to reach back to us when we reach out to them. Someone has to make the first move; this ball won't get rolling by itself. Let's keep trying to reach out to them. Let's not think about them as Statler and Waldorf, but as our brothers and sisters in the Cooper family. It's all we can really do.

# On the Art of Protesting

**Anna Vila (Art '15)**
*Originally Printed in Issue #8*

I was in St. Marks Market getting a sandwich after the [deferred art students] rally and I saw a member of the Cooper Union custodial staff. We started chatting. I asked him what he thought of the rally. He replied, "Oh yeah, it was nice, but you know everyone has it bad, it's not just you guys, times are rough, you gotta do what you gotta do."

Which I totally understand. But does that imply that because everyone has it bad, it's ok? Are we supposed to just sit down and take it? Should we just believe the lies that we're fed and do nothing because life sucks and we might as well deal with it, since we're just "spoiled and entitled brats?" Hell no. Are we spoiled and entitled for looking out for future kids and trying to ensure that they have a great future?

I don't see how spending countless hours, out of pocket money, and a whole lot of effort and planning could be seen as selfish. When I listened to those kids speak [at the rally], I realized just how much I care about all of them, and the kids that will replace them, and the kids after that.

I want them to have a fucking beautiful college experience and education, I want them to come to Cooper and I want them to learn amazing things. I want to get to know them and talk to them about art and life and become life long Cooper alum buddies with them. I want them to grow, and change, and find out things about themselves that they never knew existed. I want their entire lives to be turned upside down like mine was, and I want their minds to be blown every single day like my mind is. I love this school and I love my teachers and I love my classmates and I love my future classmates and goddamn it, I will do everything I can to make sure that there will be future classmates to have.

During the week of action back in December, we received so many letters of solidarity from student activist movements from all across the country and the world. It was beautiful. Solidarity is an amazing thing… You have all these kids somewhere, out there, and you don't even know them but the mere fact that they exist becomes a motivation. And let's not forget the fact that this is happening everywhere. Being part of a student solidarity network is important because it just makes you realize that you're not alone.

Elsewhere, out in the great big world we live in, people lose their lives fighting for what they believe in. Where I come from, people set themselves on fire to make a statement about injustice. Don't look up self immolation in Greece, that shit's fucked up.

I try to stay neutral and look at both sides of the situation, but protesting is something that I feel very strongly about. Obviously, people can do whatever they want and stand on whatever side, but I don't think I'll ever understand people who actively sneer and make fun of people trying to show that they care.

"Silly artists, so emotional - and artistic - and radical!" We've heard it all before. It's not that funny. I get frustrated trying to explain gestures and poetry and symbolics to people who immediately look for holes and mistakes in everything, because a lot of protesting is poetics: the beauty of people coming together because they care about something so much that it tears them up and all they can do is scream. I went to my first protest when I was 14 and I don't think I had ever felt more alive.

I'm not saying protesting is for everyone. I am a firm believer that people should decide their own level of involvement. I know personally, when I have been in situations where I've been obligated to participate more than I was prepared to, I left feeling gross and frustrated. Activist and social justice circles have a way of fostering a safe environment, which I think is super important.

Generally, if you're uncomfortable with something, you are more than encouraged to do whatever you think is best for you, [whether it be] speak up, leave the room, etc).

This isn't just us. Shit like this is happening everywhere. There are student protest and activist movements happening in Canada, England, and around the world because of the cost of education. Kids in Quebec hold nighttime rallies denouncing the Prime Minister's attempt to raise their tuition, often ending in fights with the police. Students in Bulgaria have been credited for helping to overthrow their government by holding rallies in response to increases in tuition.

We in the Cooper Union are part of a global movement towards fairer educational practices and administrative decisions. Beyond that, the Cooper Union needs to stand as an example to the rest of the world of what happens when we believe and demonstrate that education is priceless, when we believe that students are our future and not customers.

# *Two Takes on the Announcement of Tuition*

**Marcus Michelen (BSE '14)**
*Originally Printed in Issue #10.5*

**Part One**

As nearly every student here would say, I distinctly remember when I found out that I got accepted to Cooper. I was working on a presentation for Macroeconomics with my two closest friends and my mom called me. vWhen she told me the news, I nearly collapsed to the floor. My friends thought that someone in my family had died. When I finally got myself together and told them what happened, they were ecstatic. They knew how much this meant to me, how I had wanted this more than anything else, how it felt like it would be the single greatest day of my life.

I never knew why I wanted to go to Cooper. In middle school, I dreamt of being an architect but, more importantly, studying at Cooper. As I got older and entered high school, I realized I wasn't talented enough to be get into Cooper for architecture. I put any and all of my architecture dreams on hold: in order to go to the Cooper Union, I had to be an engineer. I wanted - I needed - to come here. I needed to come here.

There was a mystique, an aura surrounding the school in my mind, one I never bothered to contemplate until recently. It wasn't exactly the free tuition that made me so enamored with the school, but nearly everything I idolized about Cooper can be seen as a direct result of the free tuition.

I'm reminded of Alexander Sokurov's film *Russian Ark*. The film covers over 300 years of Russian history, yet consists of a single 96-minute long Steadicam shot. No one would ever argue that the single-shot structure of the film is what makes it so appealing, yet this superficially interesting constraint is responsible for nearly all of the charms of the film. In other words, a constraint with a superficial appeal sometimes nurtures lasting and deeper positive qualities.

For Cooper, the superficially appealing constraint was the full-tuition scholarship. It's certainly tempting to go to school for free, but that can't be the only reason to go to the school. The scholarship yielded many qualities that I desired, in retrospect: the school couldn't afford too many scholarships each year, so the school remained a very small, tight-knit community; students weren't treated as customers and, thus, were required to genuinely work and learn for their degree; the school was insanely competitive, giving Cooper an aura of exclusivity.

Cooper was the type of school that could take something that Mark Epstein would see as "icing on the cake" and transform it into the foundation of a mythic place of obscure charm and mystique. It seemed like magic to me.

Now that the school has decided to charge tuition, starting with the incoming class in fall of 2014, the world has finally seen the smoke and mirrors behind the magic trick that was Cooper Union. In the years I've spent at Cooper Union, I've grown up significantly:

During this time of my life, I started drinking coffee, I held a 40-hour a week job, I started monitoring my cholesterol, I was rejected from a job for the first time, and I had a job that I was specifically trained to do.

I came to accept that change probably won't happen, that when someone's neck is on the line, they will not innovate.

I had my first serious relationship, I learned to deal with failure, and I learned to treasure true success. My youthful high school ego, the one that got me into Cooper, was cut down by students far smarter than I will ever hope to be.

Perhaps most importantly, I stopped believing in magic.

**Joseph Colonel (EE '15)**

**Part Two**

He had lived through so much to get to that day, the day he learned he had been accepted to The Cooper Union. His friends all congratulated him, his parents congratulated him, the strangers that his parents had told congratulated him. His English teacher convinced him to accept the full tuition scholarship: there was no better place to get an engineering undergraduate education in the country. The college would suit him: a college in an urban environment – the Village, no less –; a small college, with a small student to faculty ratio; a college close to home, less than an hour from his birthplace.

"And, it's free."

He didn't even realize how lucky he was, he was told. His parents had really hit the lottery, he was told. Such a selective school… he must be so grateful, he was told. He would be an anomaly among his peers – he would not receive a debt totaling six figures attached to his diploma.

…

He sits in the Great Hall, five rows away from Mark Epstein, directly opposite the shorter than average man. The human twenty feet in front of him cannot control its presence in the Great Hall. The multitude occupying the seats of that hallowed speaking ground bore holes into Epstein's face with their intent. Jiggling legs, nervous laughs, idle conversations that no one cares about, abnormally heavy breathing, thinking, hoping, praying, and sweating all fill the room with their cacophony. Two years of deliberations, two years of disagreements, two years of time, two years of the occasional sleepless night contemplating this miserable day…

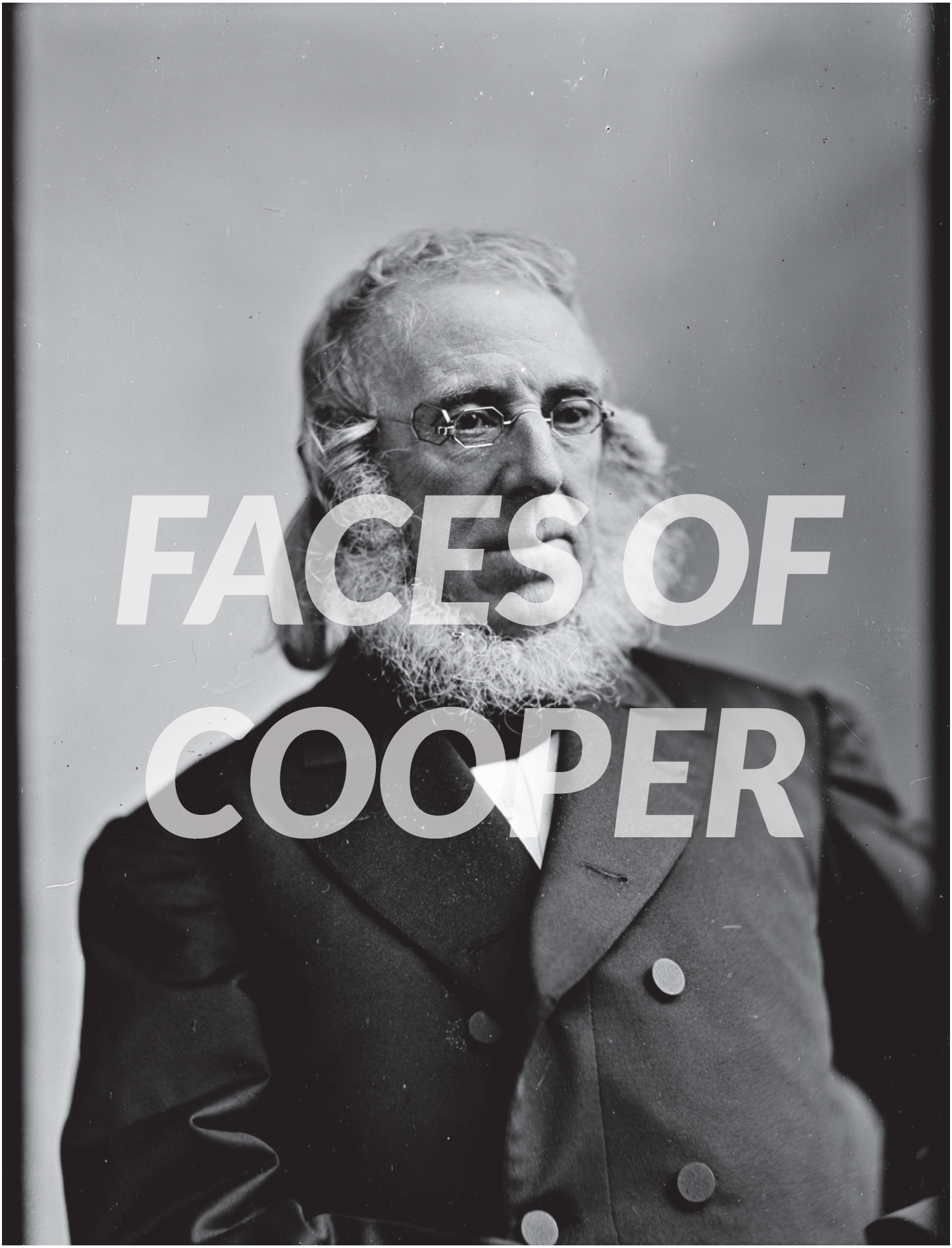
"…Consequently, the Board of Trustees voted last week to reduce the full-tuition scholarship to 50% for all undergraduates admitted to The Cooper Union beginning with the class entering in the fall of 2014."

It continues. No one rushes the podium. No one sets themselves on fire. No one sets off the bomb carefully attached to their chest, concealed under their clothes. Feedback eclipses Epstein's processed, barely amplified voice. It continues to continue.

The spectators write their questions on sheets of paper that get brought up to Epstein. He flips through some, disregards others. A girl walks up to the podium and puts her question on Epstein's podium. She taps the sheet of paper twice, then walks back to her seat. A boy places a scroll on Epstein's podium that is promptly ignored by no one but Epstein. The spectators cheer for some questions, laugh at some answers. Emotions flare, piercing the silence Epstein tends as he reads.

He has never felt more alone in his life.

He will worry about planning his senior project. He will have experienced four years of The Cooper Union for the Advancement of Science and Art. A baby faced young person will be lost within the steel façade of 41 Cooper Square, searching for a classroom, or food, or an event. He will approach the young individual. The young individual will turn, and he will look into the eyes of the Class of 2018. And he will be lucky.


FACES OF
COOPER

# Jamshed Bharucha

**Marcus Michelen (BSE '14) and Saimon Sharif (ChE '15)**

It has been about a year since Cooper Union's dire financial situation was revealed to the community as a whole and a little more than a year since President Bharucha assumed his position. Over the course of this year, he has received much indignation as well as praise from members of our community. However, not many members of our community have much knowledge about Jamshed Bharucha: the man. We interviewed President Bharucha for our Faces of Cooper series to get a better understanding of this interesting man.

*Originally Printed in Issue #3*

**The Cooper Pioneer:** First, where were you born?

**Jamshed Bharucah:** In Mumbai, which used to be called Bombay.

**TCP:** What did your parents do?

**JB:** My father was a civil engineer. A structural engineer. My mother is a musician. They met at the University of Michigan where he was studying engineering, he had come from Mumbai. My mother came from Albany, New York and she was studying music and the rest is history, or biology or chemistry!

**TCP:** What instrument did your mother play?

**JB:** She played organ and piano and she conducted choirs. She also composed some music.

**TCP:** What was your educational experience?

**JB:** My educational experience was mostly at a school that my parents helped found called The Bombay International School. They and several other couples in the city, many of them bi-national couples, all kinds of combinations got together and said they weren't happy with the schools in the city because they were too traditional, exam and memorization focused. They were single sex. They had the old caning and hitting with the ruler kind of stuff. The boys were caned and the girls were hit with rulers. So they started this new school called the Bombay International School. And I was the guinea pig and my sisters. I started in that school in first grade and went all the way through. I was in the first class to go through all the way as the school increased. And it was fabulous.

The primary and middle school were based on an American curriculum and high school was based on a British curriculum. It was University of Cambridge O levels. We had to decide starting in the ninth grade between the sciences and the humanities. I picked sciences and it was pretty rigorous. Physics, chemistry and math every semester with a few other elective courses.

I was very much interested in science and my favorite subject was physics, so at one point I thought I would do physics. Then I went to college for a year in India and got some more science and then I started as a freshman at Vassar College and very quickly got seduced by the liberal arts. I studied philosophy and music and majored in biopsychology.

Then I went to graduate school at Yale for philosophy because I was interested in the mind and body problem, which is what I was after when I majored in biopsychology, to put together the biological and the psychological. But then, while I was in graduate school in philosophy at Yale, I missed the scientific side of it so I finished up my master's degree, went to Harvard and got a PhD in cognitive psychology. Today the field would be called cognitive neuroscience. I did a lot of music on the side.

**TCP:** What did you do your thesis on?

**JB:** My PhD thesis was on cognitive models on the perception of music. So I was able to combine music with it.

**TCP:** While you were in grad school, what did you think you wanted to do?

**JB:** I wanted to teach and do research, so I was pretty clear about that once I started graduate school. That doesn't mean I was assured of getting a job. It's not easy for PhDs to get academic jobs and back then it was really touch-and-go. I think had I not gotten a tenured track job, I would have gone into computer programming. I did a lot of programming on the side, but I was lucky. I got a job teaching at Dartmouth and I worked my way up.

**TCP:** Did you teach psychology at Dartmouth?

**JB:** I taught psychology and helped found the department of psychological and brain sciences, which had previously been psychology but we made it more biologically oriented. When I got into administration I helped the department get an MRI machine. It was the first non-medical school MRI machine in the country, for teaching and research which even undergraduates could use to scan their brains and email brain images to their parents.

**TCP:** How did you end up at Tufts?

**JB:** At Dartmouth, I rose up through a number of administrative positions including deputy provost and dean of faculty. Tufts asked if I'd be interested in being Provost. I thought about it and thought it would be a great opportunity. Tufts was poised to get to the next level. I was looking for institutions that are ready to take that next step. Boston was a big attraction after Hanover, New Hampshire. And I took it.

**TCP:** Compared to Boston, how do you like New York City?

**JB:** Oh New York is amazing. The East Village is where everything is happening, right? This is, right now, Cooper Union's location, the most exciting place to be a student. As a faculty member, I'm essentially a lifelong student so this is a great place to be.

**TCP:** Is the house on Stuyvesant Street your first New York City residence?

**JB:** Yes. It is not Jesse's (my wife) first New York City residence, but it is mine.

**TCP:** Who do you live there with?

**JB:** Jesse Papatolicas, my life partner who I just married two weeks ago and our two dogs Charles and Hudson. Charles because of the Charles River and Hudson because of the Hudson River since we moved from Boston to New York. Jesse is the first lady of Cooper Union. You should get to know her. Interview her. She's very nice and a person of considerable accomplishment on her own.

**TCP:** In the little free time that you do have, what do you like to do?

**JB:** I like to listen to music and play music. I also like to play chess on the computer. It's quite addicting and if I start on the low levels of difficulty, I get really happy that I can win. So then I turn up the difficulty and it kills me. Then I decide to go on to do something else. I run two or three times a week and I go to the gym a couple of times as well.

**TCP:** Is music still a big part of your life?

**JB:** It is.

**TCP:** Do you go to concerts?

**JB:** We were at a concert last night. We'd like to do more of that and that will happen when things settle down a little bit more. Mostly what I like to do is play on an amateur basis with other people in the city. Ideally, I like to do that once a week or once every two weeks. We play string quartets at people's houses, which is what I used to do. But things are a little bit busier now. I'd say a maybe year from now that will start to become more of a routine.

**TCP:** What do you like to do when your job becomes stressful?

**JB:** Jesse and I like to go for walks. On weekends we sometimes take long walks. We've walked over the east river sometimes. We walk the dogs. We go to concerts. We check out some of the New York City restaurants. It's amazing. We have friends over and family over and the other things that I mentioned, like music and chess. Don't get me wrong, I'm not great at chess. I know some students are really good, but it's good for relaxation.

**TCP:** Do you have a favorite place to eat around here?

**JB:** Yeah. There are two restaurants that we like because they're owned by a friend of ours whose name is Jehangir Mehta who's also from Bombay. It's his own special fusion cuisine. One restaurant is called Mehtaphor. And the other is called Graffiti. They have a little bit of an Indian touch here and there but he combines Indian with Spanish, Indian with American, and it's really quite wonderful. We like the Italian restaurant on 11th street between Broadway and university place.

**TCP:** Do you have any advice that you'd like to tell to Cooper students?

**JB:** I know that it's a very demanding curriculum at Cooper Union and that's one of the great qualities. I'd say even while you excel academically, find ways to broaden your perspective. Involve yourself in other activities, be they origami or Steve Baker's athletics. He welcomes everyone even if they may not

# Zinoviy Akkerman

**Tensae Andargachew (ME '15)**
*Originally Printed in Issue #3*

**The Cooper Pioneer:** Where are you from?

**Zinoviy Akkerman:** Russia. [Well,] it's a bit more complicated [than that]. I was born in what is now Moldova and then I went to the Novosibirsk State University and got stuck there already. So Novosibirsk is Siberia, Russia. So I came here from Russia – proper Russia. Siberia even.

**TCP:** Can you tell me about your educational and professional background?

**ZA:** [My] education [was at] Novosibirsk State University. On the outskirts of Novosibirsk there is a very famous little township [campus] called Akademgorodok, with about 20 what would be called in the United States, national laboratories. And there is a university, a famous one, we used to be in. Actually, we [were involved] in research, etc. So that was my educational background pretty much. And after [doing research at] the university, I worked there for 22 years and got my PhD there. And [I] worked [there] on materials research – semiconductors, insulating materials, or what we often called dielectric materials, stuff like this, optical properties etc.

**TCP:** When did you first learn about Cooper Union?

**ZA:** 2004. [To be] very specific - hadn't heard about before. I was just uptown at City College. [I heard about it here] and then I went here for a job interview and lo and behold have been here ever since.

**TCP:** What brought you to Cooper Union? When did you start working at Cooper?

**ZA:** [I came here] in 2004. That's when I started working at Cooper. And what brought me here actually, [was that] I was switching my career to teaching and I started teaching. There was an ad that I had seen and I applied and, as I said – actually, without any problems I had been accepted to teach here. I didn't have too much trouble fighting for the place [job] but it was very nice and very unexpected. I like it very much here.

**TCP:** What is your role in Cooper? What is your department's role in Cooper?

**ZA:** My role in the department in Cooper currently is pretty much to support Professor Wolf's lectures. In the beginning, I was teaching a couple of courses – I taught Modern Physics. But after a while, and certain developments I am just teaching,

supporting I should say, Professor Wolf's teaching electricity & magnetism and mechanics.

**TCP:** How much do you like your job at Cooper?

**ZA:** [I like it] very much. It's probably the nicest job that I had. I am teaching at different places, but Cooper is certainly the best place to come to teach. For a simple reason – because of the students.

**TCP:** What advice would you give to Cooper students?

**ZA:** Oh, that's hard. Basically [the advice I'd give is] to use the opportunities that are given to them pretty much because they have very good faculty that teach them, they have very good courses here – their future is very bright. So better don't screw it up.

**TCP:** Who is your favorite professor at Cooper? Why?

**ZA:** Well I don't interact with many [so] I cannot say anything about them. But I can certainly see that the students are taught well. [Though, again] I don't have too many to compare [to].

**TCP:** What are some of your hobbies?

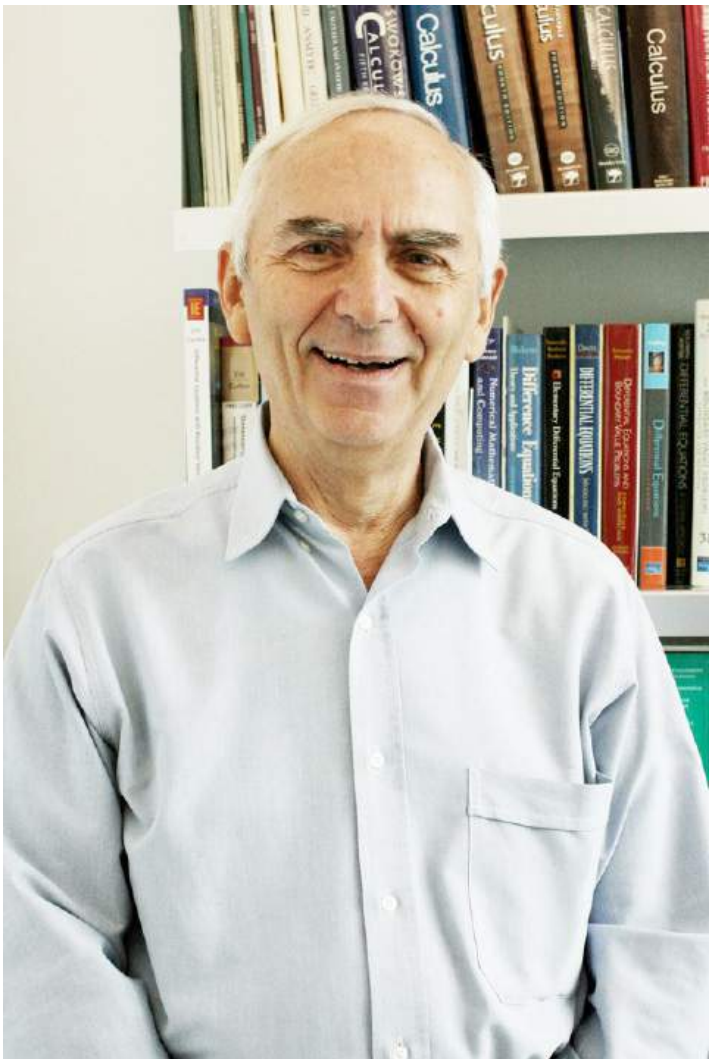
**ZA:** That's complicated. Pretty much, I read a lot. And I used to spend more time, [though] lately less, trying to develop some new problems in physics and this is very difficult. So physics problem composition I should say is still a hobby but, it's a low yield hobby because it's very hard to come by something new after three hundred years of Newton.

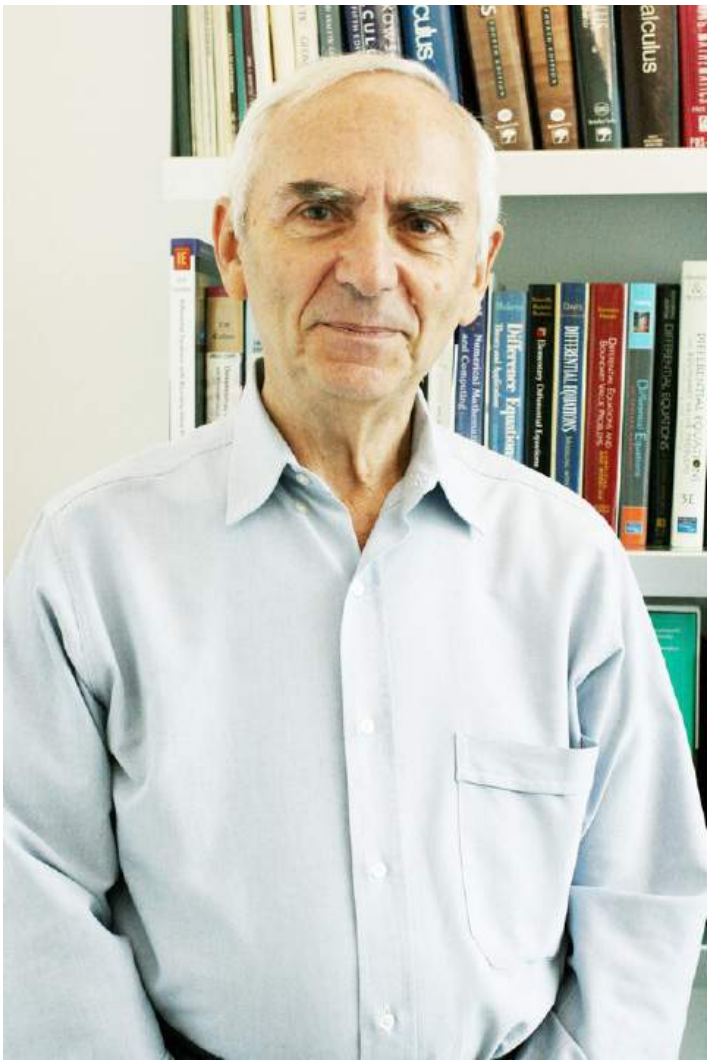
**TCP:** Do you have any closing remarks?

**ZA:** I pretty much said what I thought when I talked about the students and what advice I can give to the students. Maybe I should end on a sour note – my closing remarks are certainly the high school education in the United States should be improved because even the good students that are accepted to Cooper Union lack certain technical abilities. Is it good or bad? [It's] hard to tell by the way, but I think it's more bad than good.
So I think that this comes from very spotty, nonsystematic, high school education – very regional and not standardized. O.K. I admit that it's hard to standardize some of the disciplines, some of the subjects in high school but physics and math certainly should have certain standards that go beyond just the multiplication tables. Unfortunately, this is wishful thinking.

# Leonid Vulakh

**Caroline Yu (EE '15)**
*Originally Printed in Issue #3*




*Photographs by Jenna Lee (ME '15)*

Meet Professor Leonid Vulakh – the mathematics professor who everyone from electrical engineering students to physics professors and alumni go to for mathematical clarifications and discussion. Many students love him for his teaching style and quotable statements.

Professor Vulakh is originally from the former Soviet Union in the region that is now Ukraine. He spent most of his time in Moscow where he earned a master's degree in control science engineering from the Moscow State University. While getting this degree, Professor Vulakh was also pursuing a master's degree in mathematics at an institute of automation in Moscow. After spending two years in industry after graduation, Vulakh went back into academia at the same institution where he pursued graduate studies. After successfully earning a Ph.D., Professor Vulakh then went to teach at an institution similar to Moscow State University. It was extremely difficult to find a teaching position at a university during this time because of competition – being a professor was a very well respected occupation. After immigrating to the United States, Professor Vulakh started teaching at Brooklyn College and Baruch College in 1985. However, he was so disappointed with the student bodies at both colleges that he almost gave up teaching entirely. In 1986, Professor Vulakh came to The Cooper Union as a visiting professor. Professor Vulakh knew Harold Shapiro, a professor at New York University at the time, who in turn

knew a professor at Cooper. When Professor Vulakh was offered another year as a visiting professor, he decided to go to St. Johns as a visiting professor first. Professor Vulakh reminisced about this point in his life with a laugh: "Cooper called me back. Students had started asking 'Where is Professor Vulakh?!'" In 1988 Professor Vulakh became an associate professor at Cooper. He is very happy with his decision. He believes that his students are – and have been – perfect.

Through the years, Professor Vulakh has taught almost all the mathematics courses offered at Cooper. Regarding the importance of teaching students mathematics, Professor Vulakh believes that "[students] need a strong foundation. They need to learn how to work properly."

Other than Calculus I and II, Professor Vulakh most regularly teaches the discrete mathematics course here at Cooper. Back in the Soviet Union, Professor Vulakh wrote a book on discrete mathematics – as well as one on linear algebra. He talked to the mathematics chairmen a few years ago about adding the course. With a smile again, Professor Vulakh commented by saying "since I created the course - I am teaching it."

Because Cooper is an engineering school, Professor Vulakh strongly believes that the mathematics department has to closely work with other departments in the school. He was involved with updating and revising the calculus curriculum to better coordinate the material taught in Calculus II with other courses such as mechanics.

Other than teaching, Professor Vulakh also leads research. Selected research publications can be seen at http://engfac.cooper.edu/vulakh. Although Professor Vulakh used to be more active in the research field in past years when he attended science conferences every year, he still corresponds with other mathematicians about number theory – his area of expertise. In 2010 alone, he published three papers.

Outside of Cooper and number theory research, Professor Vulakh likes to play chess – as many people do in Russia he says. During the summer, Professor Vulakh very much enjoys swimming and biking – activities he has enjoyed since childhood. Being passionate about everything he does seems to be the trend; Professor Vulakh takes pride in always being there for professors and students: "I help students who need help. I am always available! I give them advice when I teach them. They need to spend a lot of time working. If you want to succeed you have to work – no matter how talented you are."

# Maxim Marienko

**Saimon Sharif (ChE '15)**
*Originally Printed in Issue #8*

*Photograph by Jenna Lee (ME '15)*

**The Cooper Pioneer:** Where are you originally from?

**Maxim Marienko:** I am from Russia. I was born in Omsk but I got all my degrees in Moscow where I moved at the age of 17. I graduated from Moscow Institute of Physics and Technology (Phystech), one of the most selective and arguably the best physics school in Russia.

I got my PhD from another excellent place – Kapitza Institute for Physical Problems. I've been specializing in theoretical condensed matter physics – superconductivity, superfluidity, quantum liquids and gases, organic and high-temperature superconductors, physics of correlated electrons and complex quantum phenomena in general.

**TCP:** Why did you choose physics?

**MM:** Because I love it and I have a passion for it. Physics is the most fundamental of natural sciences, and it teaches us to think and to understand the world around us. I love questioning how things work. I like the idea that my research is making a contribution to world of knowledge. I like to solve problems. It is the analytical thinking that physics develops that helps you with everything, not textbook problems – everything. And I really enjoy teaching and sharing my knowledge, it is a very rewarding experience.

**TCP:** Which university or research lab was (or is) the most exciting place to work?

**MM:** I've been working at several universities. I went for a postdoc at the University of Sherbrooke in Quebec, Canada. That is a great place for a condensed matter physicist and I learned a lot being there. I love it here in NY. With many universities around, there is a huge potential for learning, exchanging ideas, communicating with best researchers. My PhD years back in Moscow were absolutely great.

That was the first time I've got an experience working in a real research group, at a famous institution, wondering, discovering and publishing. The atmosphere was amazing – I probably didn't have that anywhere else. And I love to be at Cooper. I love the students and their attitude. I feel that they are very energetic and many of them are trying to do more than just simply attend lectures, do the homework and pass the course. It reminds me of my years at Phystech, too.

**TCP:** What is your role in Cooper? What is your department's role in Cooper?

**MM:** This is my 2nd semester here. I started with a recitation section. This semester I'm very excited to teach [the] lecture course of modern physics. It is a big class, and [that] is always a challenge, but it's so exciting to teach such a complicated subject. I am enjoying doing that – working on my lectures, being in a classroom, trying my best to explain and I hope it works Tfor students!

**TCP:** What brought you to Cooper Union?

**MM:** I knew Cooper is an excellent school and heard many good things about it. I thought, "I want to teach a course here," and I am very glad that at some point it became possible!

**TCP:** Do you have a favorite professor or colleague at Cooper?

**MM:** So far I've been working with Prof. [Alan] Wolf and with Prof. [Partha] Debroy. It's going very well so far, and I look forward to meeting with other Cooper faculty members.

**TCP:** What are some of your hobbies?

**MM:** Black and white traditional film photography, skiing, and mountain biking, if you wanted me to name three of them.

I am a big fan of black and white street and abstract photography. I do all the stages of it, including developing and printing in the dark room, even though I don't have much time for it now. I like the style of Magnum photographers, Cartier-Bresson, Joseph Koudelka, Mary Ellen Mark, Robert Frank, Ralph Gibson - the list is long actually. I've been very pedantic about a composition which is often hard to have in a street scene. You never think about the moment when you press the shutter button. You just do it when you feel everything in the viewfinder is at the right position. If you think, you will be a split second late and everything will change. So for me it's some king of sport, too.

I do mountain biking in the summer and I ski a lot in the winter. I enjoy challenging terrains, bumps, moguls, trees. And I am glad to share my passion with many friends from whom I can learn too. After all, skiing is a social sport.

**TCP:** What advice would you give to Cooper students?

**MM:** To be creative. To use their own initiative. Know your goals and be focused on them, but always try to invent something new in your life. Use your time at Cooper wisely. And once again, be creative.

# Sean Cusack

**Saimon Sharif (ChE '15)**
*Not Published*

*Photograph by Jenna Lee (ME '15)*

**The Cooper Pioneer:** What position do you have at Cooper?

**Sean Cusack:** I am an Adjunct Professor here at Cooper.

**TCP:** So where are you generally located in this building?

**SC:** Well, adjuncts aren't really located, per se. We have an office on the second floor across from the Dean's office that everyone shares. I'm pretty much only here on Wednesdays unless I'm going to a club or event or something like that.

**TCP:** Where are you from?

**SC:** I grew up in Michigan in a little suburb of Detroit is called Grosse Point which is kind of ironic since John Cusack in Grosse Point Blank, people ask me [about] that all the time.

**TCP:** Can you tell me about your educational and professional background?

**SC:** I went here to Cooper, and graduated in 1998 with a Bachelor of Science in Engineering, I like to refer to it as the "B.S." engineering degree, which has been highly useful for my life since. After Cooper, I briefly worked on a Cooper related startup, the Cooper Cooler, I actually worked on that for the summer immediately after, but I kind of diverged after that. I worked for Bloomberg, the company, for almost ten years as a computer programmer. I did all kinds of things, normally low level infrastructure programming. I left that in about 2007 and worked at Merrill Lynch for their hedge fund as a computer programmer. That was slightly more lucrative for a couple more years, until the great financial apocalypse. I was laid off during that along with everybody else in the hedge fund, basically. I then went back to Merrill Lynch as a part timer for about a year, a year later. Just doing consultant work. I continue to do consulting work, but now my job is at Jeffrey's and Company, another Wall Street firm. My boss there is another Cooper alum from many a moon ago. So there's a lot of Cooper continuity. In addition to that, I teach here at Cooper. This is my tenth year teaching part time, in addition to all these other things. I have my own startup that I'm trying to put together called learnasaurus.com which are educational videogames for children. I'm also on the alumni council, so I have like four jobs right now (laughs).

**TCP:** How did you first hear about Cooper?

**SC:** I heard about Cooper because a friend of my father who he worked with is friends with Bob Hopkins. So as a friend of a family, I came in for a day when I was a Junior in High School, and I said "Wow this is really neat! I have to apply, hopefully I'll get in." Go figure!

**TCP:** How much do you like your job at Cooper?

**SC:** I love it, I really do. I wouldn't teach part time on top of a full time job if I didn't really love coming back here. I love interacting with the students, I love trying to make the curriculum the way it should be. I have my own unique ideas. I don't think textbooks are particularly useful for computer programming. I think everything needs to be project based. I hate grading tests as much as students hate taking tests so I don't generally give exams and quizzes. So I like being able to do that. I feel like I'm able to give back to Cooper.

**TCP:** What courses do you teach?

**SC:** CS102 every Fall since 2003 and starting just this semester, EID364, an independent study in application development.

**TCP:** What advice would you give to Cooper students?

**SC:** Find something you love to do as a hobby and make it a steady thing in your life. It's always good to have one positive happy thing that you're always getting better at all the time because even if other things shift and ebb and flow, having one steady thing that makes you happy is a really good influence on anybody's life.

**TCP:** Who's your favorite professor at Cooper?

**SC:** Professor Topper. He's really great. Even though I was a BSE and was never required to take the second P-Chem course, the quantum chemistry, I took it anyway just because he was teaching. I felt he was so awesome from the first PChem, and I'm glad to be colleagues with him now. He's a really good guy. I look up to him as a professor.

**TCP:** What are some of your hobbies?

**SC:** In addition to everything else that I do, I've gone through various phases of volunteers in my life, so I've done a lot of tutoring over the years, I ran a boyscout program at a homeless shelter for three years, which took homeless boys largely with all kinds of issues and dragged them out in the woods once a month for camping so they could play with knives and fire like it was meant to be. Never an injury, I have to say. Three years of it and it all turned out well. These days, my hobby at home is learning how to play piano. I started that about three years ago and it's become a major part of my home life.

**TCP:** Do you have a grand piano?

**SC:** I don't have a grand piano, I had an electric piano for the first year of learning it and a lot of my friends knew that I wanted a real piano because you need to move to that eventually, only I didn't have much room. So I kind of told my friends I'm looking for an upright, and one day my friend called me up, and he does stage construction work for a lot of off off-Broadway, and said "Sean, you've got to call this place in Brooklyn. They're throwing out their piano!" So I called them up and sure enough they said "yeah, come down, take a look at it." It worked, it was really beautiful, I said "how much for it" and they said "just get rid of it! If you can get rid of it today, you can have it." So I took it home and it turned out to be this beautiful, made-in-New York, 1945 Sohmer with all the original ivory and keys. And it's just awesome. It's sitting in my living room and it's my favorite toy (laughs).

**TCP:** Do you have any closing remarks?

**SC:** I'd really like to see a lot of cross school, cross group projects going on. It's something that in response to the Cooperpocalypse that's been going on the past year, everyone has their own ideas for how to make the school better, both for current students and the future, and my approach from the beginning has always been to provide some kind of medium for everyone to communicate. I really want engineers and artists, faculty and alumni and administrators all doing stuff together because I think that's the way Cooper was meant to be. I think creating and giving it to the public. Doing stuff for New York City is the way this school was designed. We need to do more of it. It could be both an educational and togetherness-generating activity. So anyone who has thoughts or interests in that way, please talk to me.

# Jameel Ahmad

**Caroline Yu (EE '15)**
*Originally Printed in Issue #10*

*Photograph by Jenna Lee (ME '15)*

**The Cooper Pioneer:** Where are you originally from?

**Jameel Ahmad:** I was born in Pakistan but I came here when I was still in my teens.

**TCP:** Can you tell me about your educational and professional background?

**JA:** I went to the University of Hawaii first and got a Masters there and then I got a PhD from the University of Pennsylvania in Philadelphia. Then, I taught at a couple of places first then came to Cooper. I've been here ever since!

**TCP:** Why did you choose civil engineering? What is your favorite field within civil engineering?

**JA:** Since I was born in a developing country, there was a need for water supply and infrastructure and roads. So I was attracted to that. I liked science and math – those were my favorite subjects. Engineering is a natural profession grounded in science and math. It also is an applied profession so this is the reason I went into civil engineering. And then I found out that the civil engineering field is really broad. You can do a lot of things. For example, you can work in structural engineering or you can design transportation systems or waste-disposal systems. You don't really feel like you're confined to one field.

I'm a structural engineer. One interesting area that appealed to me was the generation of power from flowing water – hydroelectricity. I had an interest in building dams. Lately, we don't build dams so now we have kinetic hydro-power which means how to extract energy from flowing water. I have a patent for a new technology which I got in 2008.

The real world isn't disciplinary. It's quite multidisciplinary. Disciplines are the way fields are organized but not how the problems are solved. The difference is that when you get involved in a real project – it really doesn't really go by discipline. For example, in any of the engineering projects, permitting requirements, financing issues, return investments, and ethical issues are also involved. I think not all of those we learn while we're in school because we only have a small amount of time – four years for an undergraduate degree but it's sort of amazing to work with very many different people. A lot of different professional people involved. As a structural engineer, I work with architects a lot. This is the nature of how design is done. You also deal with owners, contractors, labor forces, unions contracts, how to procure materials, [and] environmental issues. So, it's a large team effort and engineers work on very large projects! This skill that one has to develop is how to network with other professionals, how to communicate, [and] how to outreach the community. Our projects have a very large impact on the community. We need to get the community involved very early on in the project.

**TCP:** What is your role in Cooper? What is your department's role in Cooper?

**JA:** I'm a professor in the Civil Engineering department. I'm the chairman of the department also. The engineering school is

basically divided into four degree departments with separate faculty in each department. There is interaction with other departments – including the school of architecture. We are trying to develop that collaboration. Next year we plan to offer a lab course which will be available to the engineers and the architects. This will basically be a course on the testing of building materials – it'll be done in our structures and material lab in the CE department.

**TCP:** Do you have a favorite professor or colleague at Cooper?

**JA:** Well, I have a very big respect for the Cooper faculty. You have to be a good teacher and a very knowledge person to be able to teach here because our students are very gifted students and they don't really need to be spoon fed. You realize that very early on. It's a challenge to teach here. It's never really dull because the students are always very mature into the field and their high level of interest and you have to keep them motivated and keep yourself motivated. I don't one or two favorites – almost every faculty member in the engineering school know their field. In my own department, I have very experienced faculty members that have been here for decades. You can learn from them and collaborate with them. Some of the young faculty are very impressive. I see them and they are working with a different technological world. Twenty to thirty years ago we didn't have the technology we have today. The instruction has changed a lot. The students have changed a lot! You have to keep up to date on your knowledge.

I attended a lecture just last night, which was about the tallest building world which is being designed in Saudi Arabia – Kingdom Tower. 1000 meters high. The kind of challenges they were talking about were incredible. If you interact with the faculty, you can learn a lot. If you find out what they're doing – it always amazes me. They're doing great things!

**TCP:** What are some of your hobbies?

**JA:** I like to travel. I also like food. I cook. I also like to read – not necessarily about engineering. I was recently in Paris and it was such an interesting experience because it has such a rich history. It has tremendous food.

**TCP:** What advice would you give to Cooper students?

**JA:** I believe that each generation meets their own challenges. Just like when I was a young engineer, I saw the challenges - the space program that was just getting underway. Even the mainframe computers weren't invented yet! We prepared and couldn't really seek advice. I worked for the space program as a graduate student the University of Pennsylvania. This project was to put a man on the moon – this was started under President Kennedy. There was no blueprint to do that! We were very young and when we were working on this program they would discourage us to seek guidance from senior people. And we said, "What do you mean?!" He said because they will tell you, you can't do it – there are so many unknowns.

My advice is to have new challenges. You should look at those challenges from the prism of your own self: "I would like to solve this problem and invent something new." You need a lot of knowledge based on experience but that experience is based in prior history but it's not based on the future. My hope is that students will be prepared to address those challenges that might not have addressed in a course or lecture. You have to prepare yourself for the future. I got my undergraduate degree exactly 50 years ago. The amazing thing is that I'm still working in this field. One of the things I keep in mind when I'm teaching students is that they might be active in their profession for 60-70 years! The best thing we can hope to do is to make sure students learn how to teach themselves and develop a mind set. To have confidence in your ability and to give everything their best shot. They have to build their own world – it's a very exciting world!

# Samuel Wiener

**Chae Jeong (ChE '16)**
*Originally Printed in Issue #10*


*Photograph by Jenna Lee (ME '15)*

**The Cooper Pioneer:** Where are you from?

**Samuel Wiener:** I was born in Chicago and my family moved to California and then when I was about 5 or 6 they moved back to Brooklyn but I found them.

**TCP:** Can you tell me about your educational and professional background?

**SW:** [I was] educated in Brooklyn: Abraham Lincoln High School, Brooklyn College for Master's Degree.

Well the Vietnam War got in the way of my graduate studies so I went into teaching in 1966. And I started out at John Bowne High School in Queens and then I transferred to Brooklyn Tech and in 1975, I became the Physical Sciences Chairman at Brooklyn Tech and I stayed there until 1991, when I retired and I've been working and teaching part time since then. I've been at Cooper Union for 11 years. This is my 47th year teaching chemistry. So 3 more to go.

**TCP:** What brought you to Cooper Union?

**SW:** I saw an ad in the New York Times many, many years ago and I sent in my CV and I forgot about it completely. One day I got a call asking if I could teach a freshman lab. The time was 2 o'clock but I couldn't get here by 2 o'clock so I said maybe some other term. A week later I got a call again asking if I could come by 3. They had rescheduled the class from 3 to 6 and that's when I started in January of '02.

**TCP:** What is your role in Cooper?

**SW:** Well basically I teach one section of general chem lab in the fall and a few in the spring. So I see the entering class when they're brand new and after they've been housebroken by one semester.

**TCP:** How much do you like your job at Cooper? And what do you like most?

**SW:** Oh, I just like being here because the kids are so bright and so enthusiastic. That's the best part of it really.

**TCP:** What advice would you give to Cooper students?

**SW:** Whatever you've done so far, keep doing more of it.

**TCP:** Who is your favorite professor at Cooper? Why?

**SW:** Oh, I've always looked up to Professor Bove who's taught as long as I want to teach which is more than 50 years. He retired last year but he's still teaching here part-time.

**TCP:** What are some of your hobbies?

**SW:** Well, I like classical music and reading the history that no body else reads.

**TCP:** What kind of history is that?

**SW:** Oh, European history but written by 17th and 18th century authors, which is pretty tough stuff.
I like walking around a lot and travelling. For the past 15 years or so, I've been doing consulting work in electrochemical corrosion in the Philippines. I usually go there twice a year

**TCP:** Do you have any closing remarks?

**SW:** No. Except that I really hope that some very wealthy person decides to give Cooper Union between 3 and 4 million dollars so that the tuition can be free forever.

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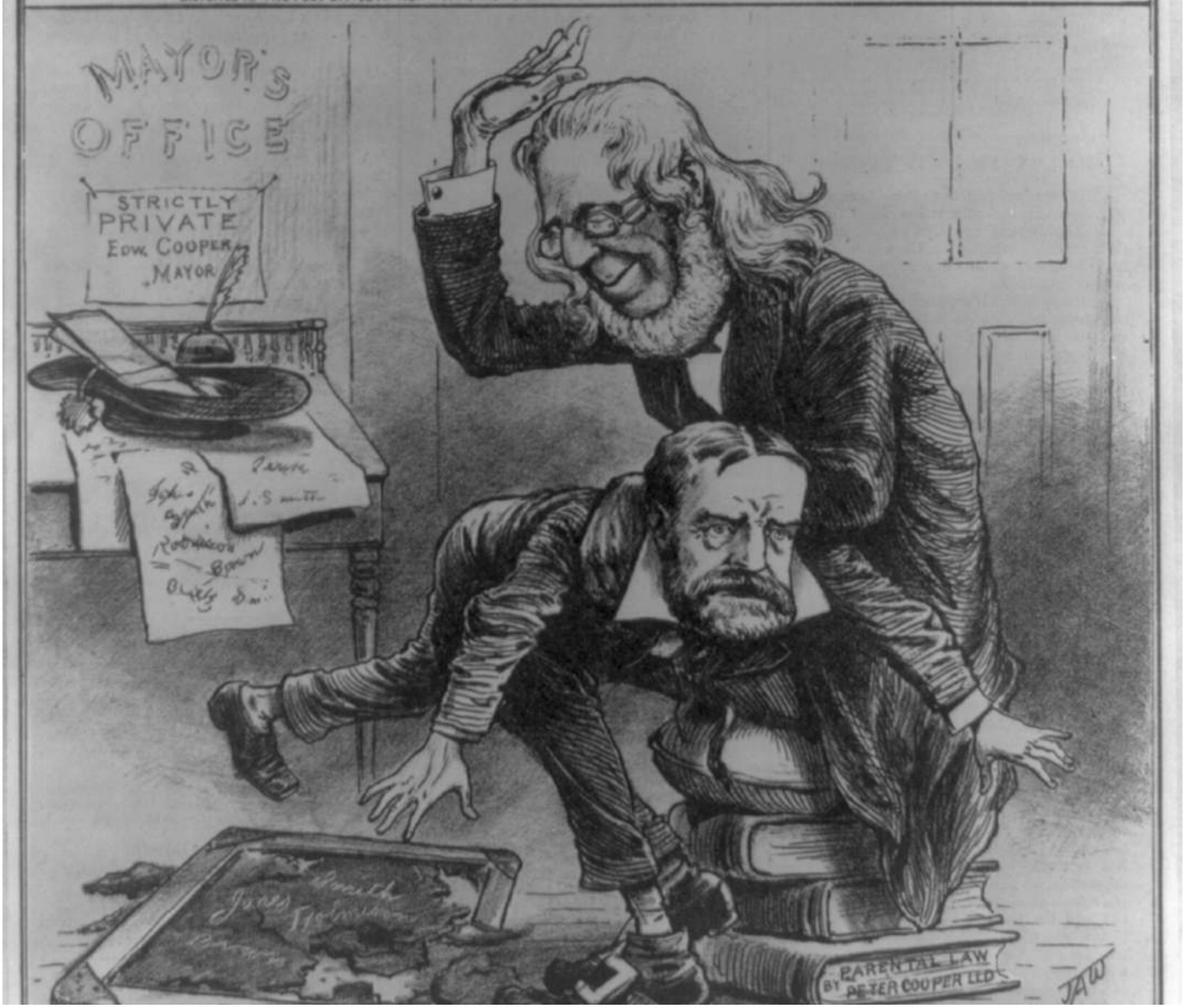
"What fools these Mortals be!"
MIDSUMMER-NIGHTS DREAM.

# Puck

PUBLISHED BY KEPPLER & SCHWARZMANN. NEW YORK OFFICE No. 21 - 23 WARREN ST.
TRADE MARK REGISTERED 1878.
"ENTERED AT THE POST OFFICE AT NEW YORK, AND ADMITTED FOR TRANSMISSION THROUGH THE MAILS AT SECOND CLASS RATES."



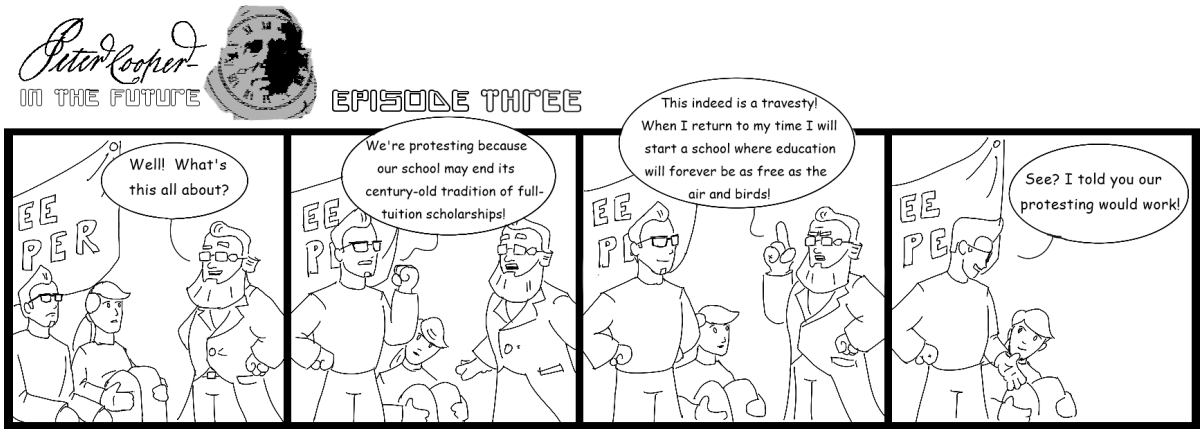

PETE
COMICS

# Comics

**Jake Potter (ME '16)**


*Originally Printed in Issue #3*


*Originally Printed in Issue #4*

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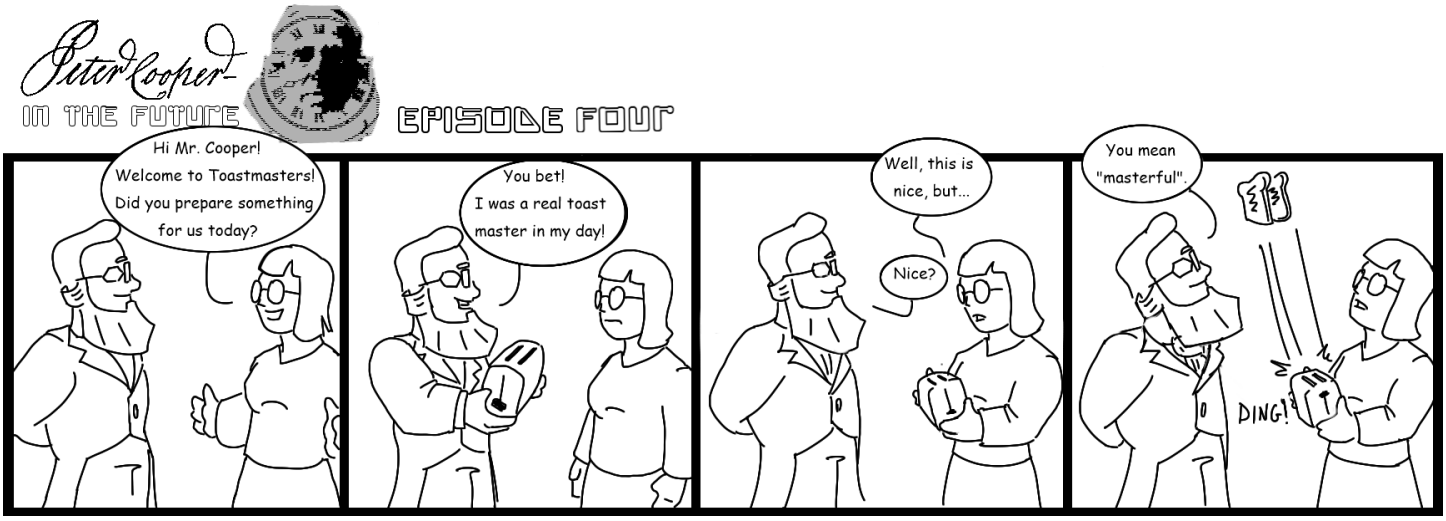


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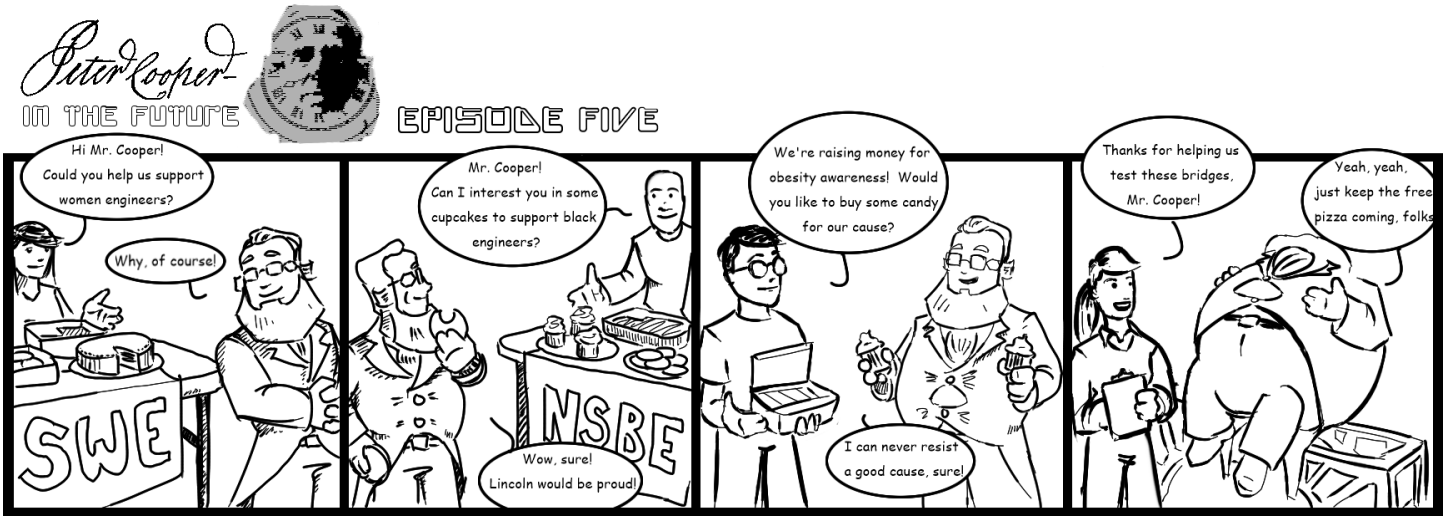


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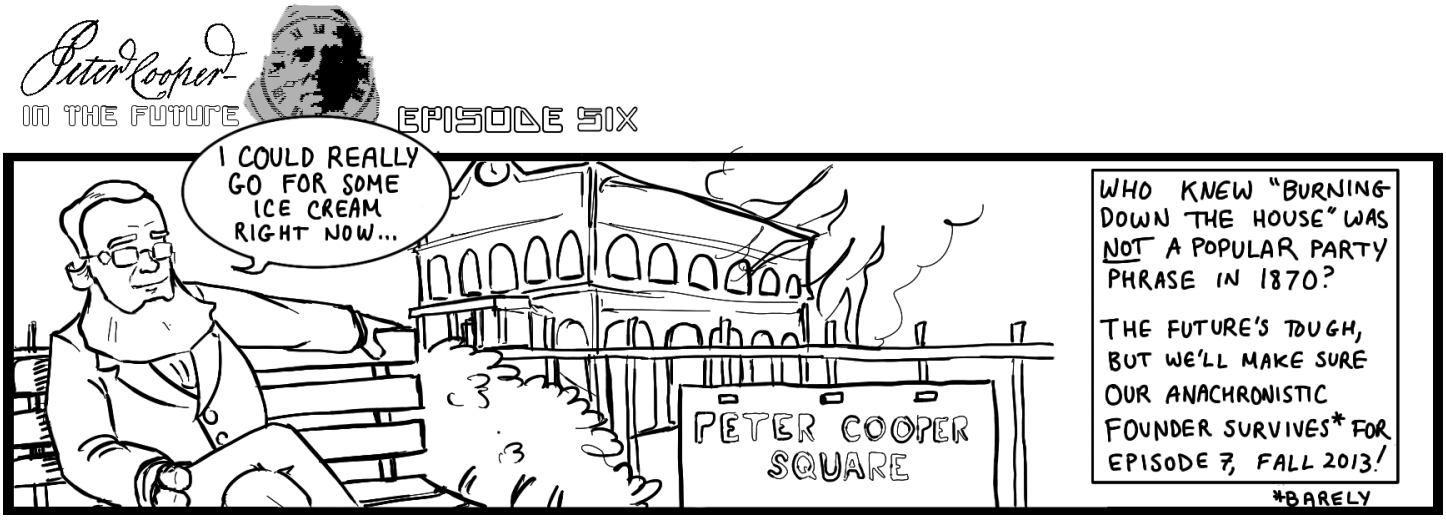


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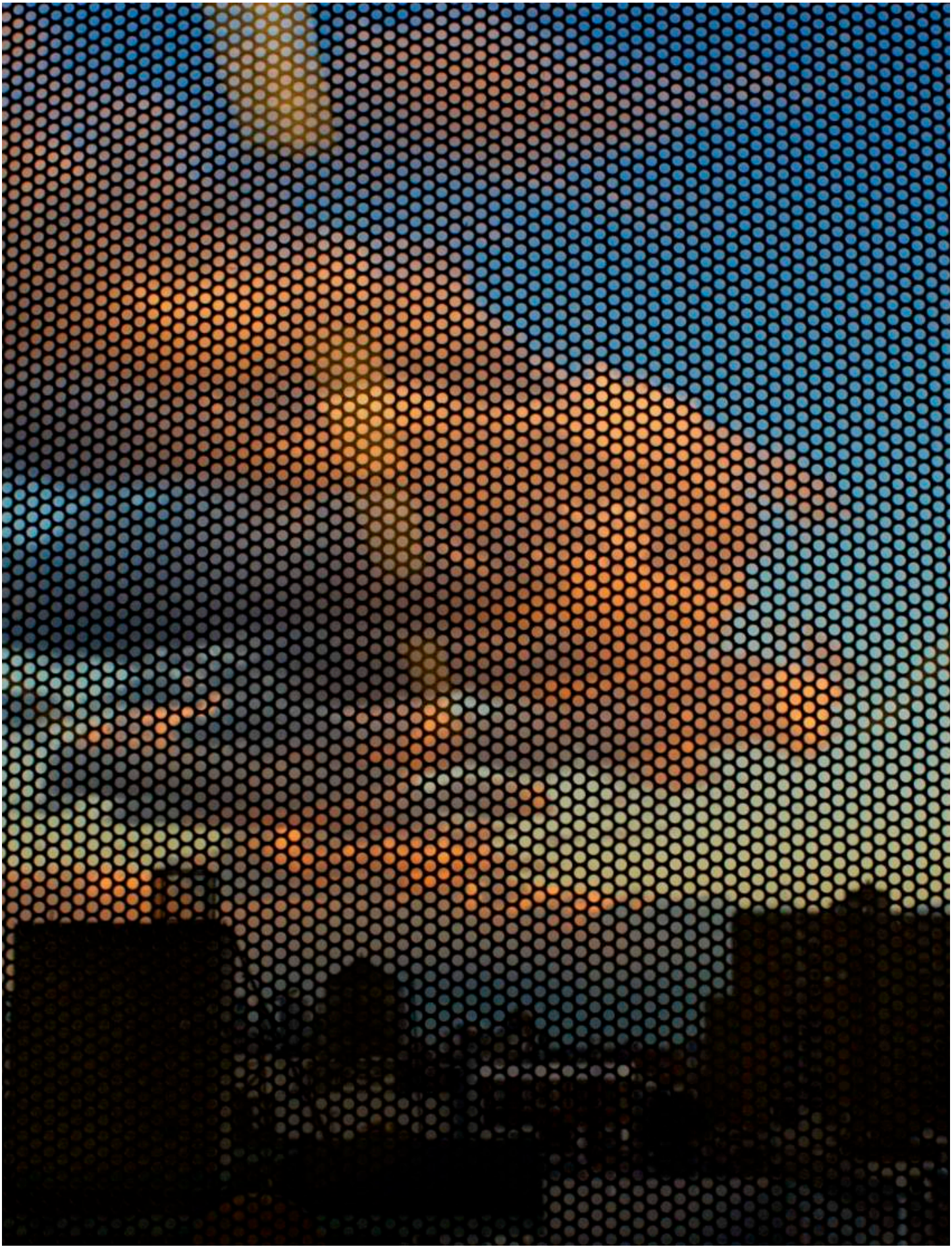
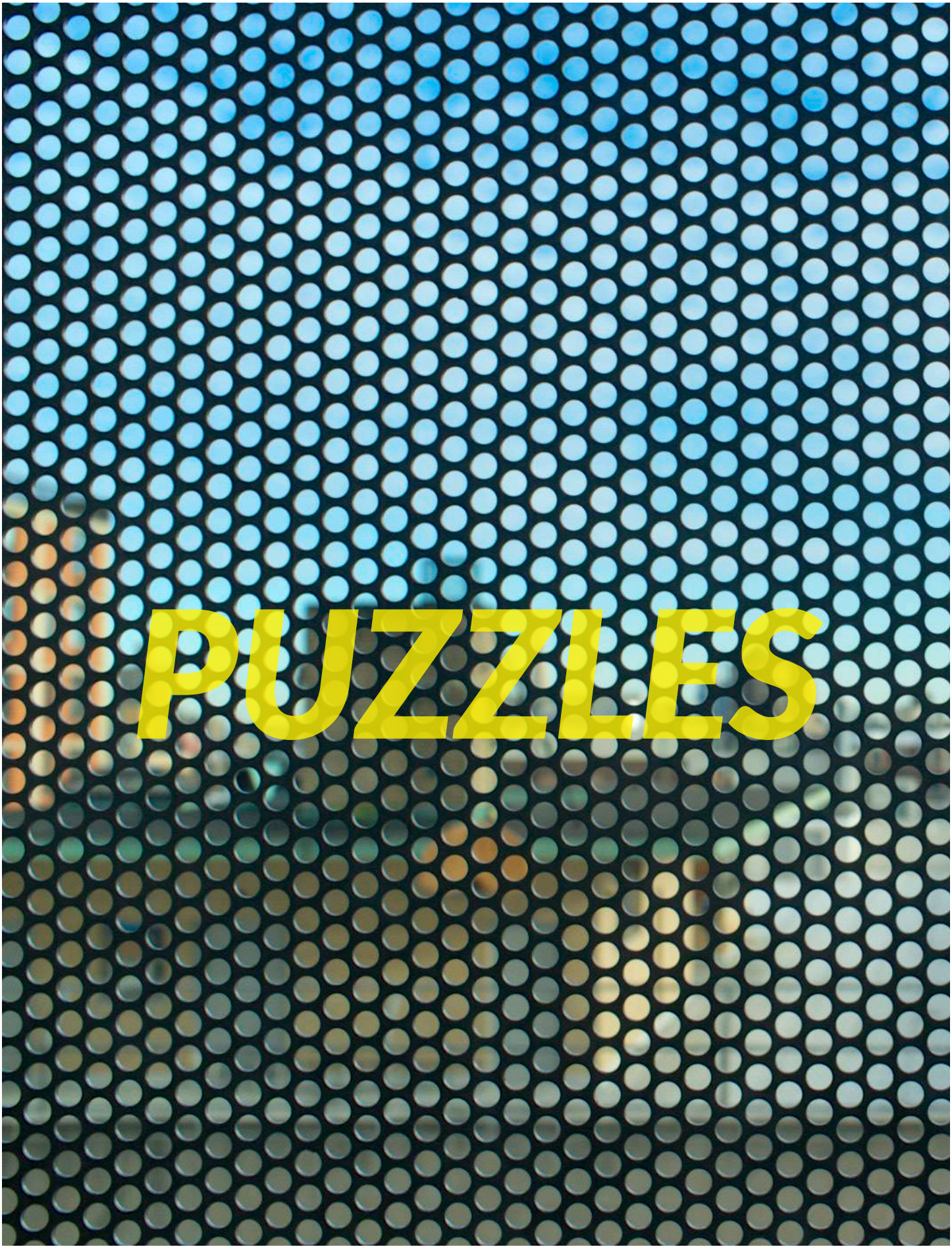



PUZZLES

# KenKen

KenKen is a Japanese paper puzzle by Tetsuya Miyamoto much like Sudoku, only it involves both math and logic. It roughly translates to "cleverness-cleverness."

**Instructions:** Like Sudoku, each row and column must contain the numbers from 1 to 5, for a 5x5 KenKen or 1 to 6 for a 6x6 KenKen and so on. The number in the upper-left corner of the bolded shape made up of squares is the number you need to get by using the operation next to the number.

| | | | | |
|---|---|---|---|---|
| 6× | | 1- | | 6+ |
| 2- | 2÷ | | 2÷ | |
| | 3- | 3 | | 1- |
| 9+ | | 6+ | | |
| | 3- | | 5+ | |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 5- | | 1- | | 10× |
| 3÷ | 192× | | 14+ | | |
| | | | | 1- | |
| 9+ | | 3+ | | 2÷ | |
| | 3- | | 13+ | | 3÷ |
| 14+ | | | | | |

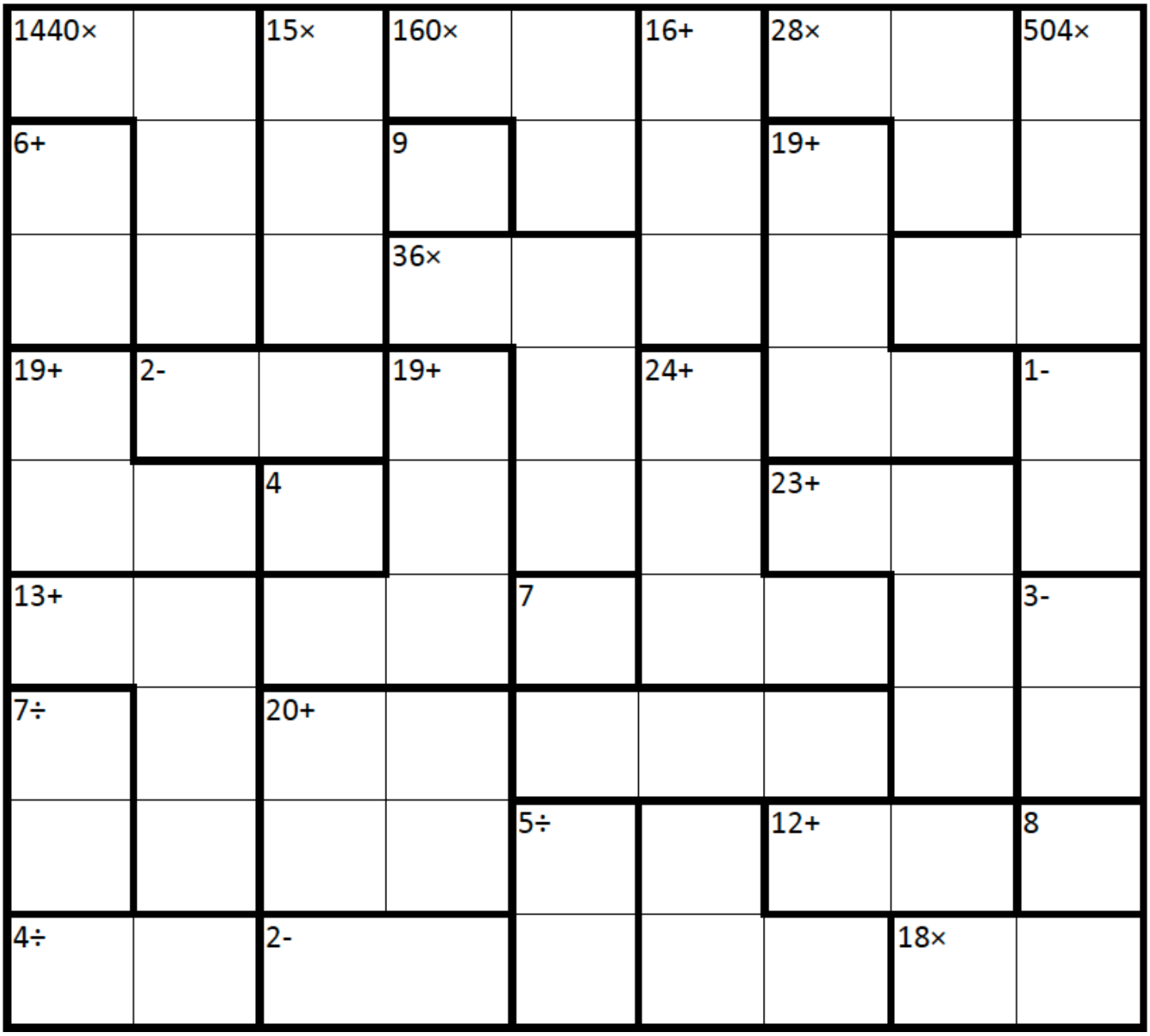
| | | | | | |
|---|---|---|---|---|---|
| 3+ | | 9+ | | 8+ | |
| 6+ | | 4+ | | | |
| 9+ | 4+ | 7+ | 7+ | | |
| | | | 5+ | 5+ | |
| 8+ | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 17+ | 72× | | 120× | 2× |
| 72× | | | | | |
| | | | | | 15× |
| | | 10× | 36× | 2 | |
| 8+ | | | | | 24× |
| | 4 | | 8+ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | 36× | | 18+ | 5÷ | 11+ | |
| 15+ | | | | | | 2 |
| | | 5- | 13+ | | 14+ | 5× |
| | 28× | | 4 | 17+ | | |
| | | 12+ | 3÷ | | | |
| 2- | | | | | | 4- |
| 6× | | | | 28× | | |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 11+ | | 9+ | 14+ | |
| 40× | 6 | | | | 14+ |
| | 13+ | | | | |
| | | | 60× | | |
| 18× | | 4 | | 6÷ | 10× |
| | 6× | | | | |

| | | | | |
|---|---|---|---|---|
| 20× | 5 | 1- | 6+ | |
| | 8+ | | 1 | |
| 2÷ | | | 120× | 1- |
| | 2÷ | | | |
| 15× | | | | |


1440×
15×
160×
16+
28×
504×
6+
9
19+
36×
19+
2-
19+
24+
1-
4
23+
13+
7
3-
7÷
20+
5÷
12+
8
4÷
2-
18×

# *Cryptoquotes*

A Cryptoquote is an encoded quote. It is encoded such that each and every occurrence of a letter is substituted with a different letter of the alphabet. Using clues such as frequency of occurrence and placement, the original quote can be found. For instance, the word XBDIKCXXBZ could be deciphered to reveal the word LONGFELLOW.

"JHGAYG WXL'S QXLBPXLS CG MESD CU BAEHIPGY. E DAW LXS BXPNXSSGL SDGC."
– TAQVYXL OPXMLG

---

"CAL EY ECCXPSAH, LXS OGQAIYG DG AHXLG ACXLN QPGASIPGY DAY AL ELGRDAIYSEOHG ZXEQG, OIS OGQAIYG DG DAY A YXIH, A YJEPES QAJAOHG XB QXCJAYYEXL ALW YAQPEBEQG ALW GLWIPALQG."
– MEHHEAC BAIHVLGP

---

"ES'Y YX GAYU SX HAIND. ES'Y YX GAYU SX DASG. ES SAVGY YSPGLNSD SX OG NGLSHG ALW VELW."
- CXPPEYYGU

---

"SDG CXYS GRQESELN JDPAYG SX DGAP EL YQEGLQG, SDG XLG SDAS DGPAHWY SDG CXYS WEYQXZGPEGY, EY LXS 'GIPGVA!' OIS 'SDAS'Y BILLU...' "
- EYAAQ AYECXZ

---

"LEGSFQDG QHAECGW SDAS DEY NGLEIY MAY EL DEY LXYSPEHY ALW E SDELV SDAS EY A ZGPU GRQGHHGLS JHAQG BXP ES SX OG."
- BGWGPEQX BGHHELE

---

"MDAS A MXLWGPBIH SDELN, SX OG QXLYQEXIY! E MXLWGP MDAS SDG JGXJHG EL LGM TGPYGU WX."
- MXXWU AHHGL

---

"E OGAEGZG SDHS EB AEBG NEZGY UXI AGCXLY, UXI YDXIAW CHVG AGCXLHWG... HLW SPU SX BELW YXCGOXWU MDXYG AEBG DHY NEZGL SDGC ZXWVH, HLW DHZG H JHPSU."
- PXL MDESG

---

"E WX LXS YIJJXYG E YDHAA OG PGCGCOGPGW BXP HLUSDELN. OIS E WXL'S SDELV HOXIS CU MXPV EL SDXYG SGPCY. ES EY TIYS HY ZIANHP SX MXPV BXP SDG YHVG XB JXYSGPESU HY SX MXPV BXP CXLGU."
- XPYXL MGAAGY

# Solutions

*The following are the solutions to the KenKens and Cryptoquotes on the preceeding pages. The nine by nine KenKen is left as an exercise for the reader.*

| | | | | |
|---|---|---|---|---|
| 2 | 3 | 5 | 4 | 1 |
| 3 | 4 | 2 | 1 | 5 |
| 1 | 5 | 3 | 2 | 4 |
| 4 | 2 | 1 | 5 | 3 |
| 5 | 1 | 4 | 3 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 1 | 6 | 3 | 4 | 5 |
| 3 | 6 | 4 | 5 | 1 | 2 |
| 1 | 2 | 3 | 6 | 5 | 4 |
| 5 | 4 | 1 | 2 | 3 | 6 |
| 4 | 5 | 2 | 1 | 6 | 3 |
| 6 | 3 | 5 | 4 | 2 | 1 |

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 5 | 4 | 3 |
| 2 | 4 | 3 | 1 | 5 |
| 4 | 3 | 1 | 5 | 2 |
| 5 | 1 | 2 | 3 | 4 |
| 3 | 5 | 4 | 2 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 2 | 3 | 4 | 6 | 1 |
| 3 | 5 | 6 | 1 | 4 | 2 |
| 2 | 6 | 4 | 5 | 1 | 3 |
| 4 | 3 | 1 | 6 | 2 | 5 |
| 6 | 1 | 5 | 2 | 3 | 4 |
| 1 | 4 | 2 | 3 | 5 | 6 |

| 7 | 4 | 3 | 5 | 1 | 2 | 6 |
|---|---|---|---|---|---|---|
| 4 | 1 | 6 | 7 | 5 | 3 | 2 |
| 5 | 3 | 2 | 6 | 7 | 4 | 1 |
| 6 | 2 | 7 | 4 | 3 | 1 | 5 |
| 2 | 7 | 1 | 3 | 6 | 5 | 4 |
| 3 | 5 | 4 | 1 | 2 | 6 | 7 |
| 1 | 6 | 5 | 2 | 4 | 7 | 3 |

| 2 | 5 | 1 | 6 | 3 | 4 |
|---|---|---|---|---|---|
| 4 | 6 | 5 | 1 | 2 | 3 |
| 1 | 4 | 3 | 2 | 5 | 6 |
| 5 | 2 | 6 | 3 | 4 | 1 |
| 3 | 1 | 4 | 5 | 6 | 2 |
| 6 | 3 | 2 | 4 | 1 | 5 |

| 4 | 5 | 3 | 2 | 1 |
|---|---|---|---|---|
| 5 | 4 | 2 | 1 | 3 |
| 2 | 3 | 1 | 5 | 4 |
| 1 | 2 | 4 | 3 | 5 |
| 3 | 1 | 5 | 4 | 2 |

"PLEASE DON'T CONFRONT ME WITH MY FAILURES. I HAD NOT FORGOTTEN THEM."
– JACKSON BROWNE

---

"MAN IS IMMORTAL, NOT BECAUSE HE ALONE AMONG CREATURES HAS AN INEXHAUSTIBLE VOICE, BUT BECAUSE HE HAS A SOUL, A SPIRIT CAPABLE OF COMPASSION AND SACRIFICE AND ENDURANCE."
– WILLIAM FAULKNER

---

"IT'S SO EASY TO LAUGH. IT'S SO EASY TO HATE. IT TAKES STRENGTH TO BE GENTLE AND KIND."
– MORRISSEY

---

"THE MOST EXCITING PHRASE TO HEAR IN SCIENCE, THE ONE THAT HERALDS THE MOST DISCOVERIES, IS NOT 'EUREKA!' BUT 'THAT'S FUNNY...' "
– ISAAC ASIMOV

---

"NIETZCHE CLAIMED THAT HIS GENIUS WAS IN HIS NOSTRILS AND I THINK THAT IS A VERY EXCELLENT PLACE FOR IT TO BE."
– FEDERICO FELLINI

---

"WHAT A WONDERFUL THING, TO BE CONSCIOUS! I WONDER WHAT THE PEOPLE IN NEW JERSEY DO."
– WOODY ALLEN

---

"I BELIEVE THAT IF LIFE GIVES YOU LEMONS, YOU SHOULD MAKE LEMONADE… AND TRY TO FIND SOMEBODY WHOSE LIFE HAS GIVEN THEM VODKA, AND HAVE A PARTY."
– RON WHITE

---

"I DO NOT SUPPOSE I SHALL BE REMEMBERED FOR ANYTHING. BUT I DON'T THINK ABOUT MY WORK IN THOSE TERMS. IT IS JUST AS VULGAR TO WORK FOR THE SAKE OF POSTERITY AS TO WORK FOR MONEY."
– ORSON WELLES

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# Acknowledgements

The Pioneer would like to thank Gwen Hyman for all her support and help as our Faculty Advisor.

# Letter from the Editor

Running The Pioneer the past year has been a stressful yet rewarding experience. At the end of this long and tumultuous year, I am proud to say that I’m handing The Pioneer off to Saimon Sharif (ChE ‘15). I know that he’ll do a fantastic job and I hope he has less to write about than we did this year.


The Pioneer