CITY COUNCIL
CITY OF NEW YORK

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TRANSCRIPT OF THE MINUTES

of the

COMMITTEE ON HIGHER EDUCATION AND TECHNOLOGY

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May 9, 2012
Start: 1:15 p.m.
Recess: 3:45 p.m.

HELD AT: 250 Broadway
Committee Room, 16th Floor

B E F O R E:
YDANIS A. RODRIGUEZ
FERNANDO CABRERA
Chairperson

COUNCIL MEMBERS:
Jumaane D. Williams
Larry B. Seabrook
Mark Weprin
Deborah L. Rose
Letitia James
Gale A. Brewer
G. Oliver Koppell

A P P E A R A N C E S (CONTINUED)

Feniosky Pena-Mora
Dean of the Fu Foundation
School of Engineering
Columbia University

Dr. Lisa Coico
President
City College
CUNY

Joseph Barba
Dean
School of the Engineering
City College

Ardie Walser
Associate Dean
City College
CUNY

Jeremy Cortez
Student
City College

Walter Matystik
Associate Provost
Tim Ward
Manhattan College

Alfred Spector
Vice President of Research
Google

Iqram Magdon-Ismail
VENMO

Dr. Richard Burke
Maritime College
State University of New York

A P P E A R A N C E S (CONTINUED)

Yash Risbud
Director, C. V. Starr Research Foundation
Cooper Union for the Advancement of Science and Art

Dr. Rahmat Shoureshi
New York Institute of Technology

Dr. Nada Anid
New York Institute of Technology

CHAIRPERSON RODRIGUEZ: My name is Ydanis Rodriguez, I am the Chair of the Higher Education Committee. And first I would like to inform you that today's hearing will be webcast. And today we have a joint hearing with the Technology Committee.

We will hear testimony on the various engineering undergrad and graduate programs offered by schools in the metropolitan area, and how these schools are preparing students for careers in the modern economy.

Before we begin I would like to acknowledge my colleague from the Higher Education Committee, my colleague Council Member Jumaane Williams, and my colleague and Chair of the Technology Committee will also Fernando Cabrera will acknowledge his member when they arrive.

New York is and has always been on the forefront of the technology. Today frontier for technology center of the internet and other technology--and other high-tech industries. Facebook recently bought two New York City-based companies and 10% of Google's global workforce work in a building in Chelsea. There's no

question, New York is still a highly desirable place for some of the most advanced companies, and a great, brilliant ground for new companies.

To maintain our place at the vanguard of technology, the technological revolution, the city need a steady stream of engineering prepared to work in today's research and development in the ever-emerging field. The committee wanted to determine what education opportunity exists for our future engineers who would like to study in our great city.

There are about ten schools in the area that offer undergrad and graduate degree in engineering and we expect to hear from several of these schools. Today, I am looking forward to their testimony.

Among today's panelists we will hear from Dean Feniosky Pena-Mora, Dean of the Fu Foundational School of Engineering at Columbia University. Dean Pena-Mora is the academic leader. Under his leadership, the Fu Foundational School has seen its national ranking elevated from 21 to 15. And who had diligently worked to increase diversity among the student body and

faculty at the engineering school.

We will also hear from President Lisa Coico of CUNY City College, and the Dean s, Dean of the Grove School of Engineering, under the leadership the Grove School of Engineering has record of graduating the largest percentage of its students of colors in the nation in the field of engineering.

Thank you for attending. I will now call the first panel is a witness, someone that makes all New Yorkers proud for his leadership and contribution to the School of Engineering at Columbia University, raised in Washington Heights, the district that I represent, I call now up to be the first panelist, Dean Feniosky Pena-Mora at Columbia University.

MALE VOICE: And Cabrera has a statement.

CHAIRPERSON RODRIGUEZ: I'm sorry, Dean, let me--I'm sorry, before we begin [off mic] sorry, my colleague, Fernando Cabrera.

CHAIRPERSON CABRERA: It's okay, Co-chair.

Good afternoon and welcome to the

joint oversight hearing in how New York City engineering schools prepare their students for the future.

The importance of engineering in today's society cannot be overemphasized. As the technology sector rapidly grows, engineering talent is in high demand. This progression has been especially appearing in New York City in the last few years. According to an analysis by the New York Times, more than 400 technology startups in New York City raise money from investors from 2009 to 2011.

Last fall, New York City surpassed Boston--I like the ring of that--to become number two in the country in total available venture capital. Just last week, Microsoft announced it is opening a research lab in the city. New York City's tech bloom has created a high demand for engineers last year to access the city digital state, NYC Digital gathered input from dozens of city agencies and thousands of New Yorkers through surveys, social media tools, and in person, gatherings, and interview. According to NYC Digital's report, the chief need expressed by

businesses was for a greater engineering talent pool. New York City has several notable engineering schools that are currently contributing to this growing economic engine.

Today's joint hearing will examine how this engineering school prepares students for this growing and ever-changing field and whether these schools are keeping up with demand for graduates with engineering degrees.

Turn it over to my co-chair.

CHAIRPERSON RODRIGUEZ: Now is the time to--

[Pause]

CHAIRPERSON RODRIGUEZ: --in our community, the great leader in the academic field of engineer, Dean Feniosky Pena-Mora.

[Pause]

FENIOSKY PENA-MORA: Chairman Rodriguez, Chairman Cabrera, and member of the New York City Council Committee on Higher Education and Committee on Technology, I am Feniosky Pena-Mora, Dean of the Engineering School at Columbia. On behalf of Columbia University and the Fu Foundation School of Engineering and Applied

Science, I would like to thank the committees for holding this hearing jointly to examine the question of how New York City Engineering Schools prepare their students for the future. I am grateful for the opportunity to share with you this afternoon the philosophy of engineering education that defines Columbia Engineering.

Last month, I was invited to present a talk on the future of engineering education in North America at the 33rd Annual Convention of Pan American engineers. I was privileged to share with them, as I am sharing with you, this philosophy of engineering education.

At Columbia Engineering, we have created an educational paradigm that can be represented by two Greek letters, pi and phi. Think of this paradigm as similar to pi, with two columns supporting a crossbeam, in the proportions of the golden ratio, phi. Some engineering philosophies look more like the capital letter I with great depth in technical subject matter, but not much breadth. Others, like the capital letter T, which has depth and some breadth. A pi

according to phi engineering education encompasses much more than rigorous mastery in the fundamentals of engineering discipline represented by the first supporting column.

It is the perfect proportion that emphasizes, as the second supporting column of pi, knowledge gained through research experiences, entrepreneurship programs, community-based service learning, internships, externships, and global experiences abroad. These experiences are essential for today's engineering and applied scientists to understand how engineering is making a difference in the real world. These co-curricular and extracurricular activities all add to the strength of the second support column.

The overarching crossbeam between pi's two support columns is the knowledge gained in the study of the liberal arts. Columbia's core curriculum provides a student with wide-ranging perspectives on transformative ideas in literature, philosophy, history, music, art, and science. Using methods developed by Socrates, it hones critical thinking skills so essential to engineering, learning to define the problem,

examine the evidence, analyze the information, and, ultimately, address the problem.

It is only through an understanding of the humanities that the engineer of today and tomorrow will contextualize the combination of the knowledge gained in the academic discipline and the enriching experiences that complement it. Hence, the future engineer is best served by the educational philosophy of pi according to phi.

I would like to highlight several additional facts that, when taken in conjunction with our engineering educational philosophy, ensure that Columbia is educating the next generation of engineers and applied scientists to become innovative, social responsible leaders in industry, government, and academia, and who strive to improve the human condition, locally, nationally, and globally. We are building on a legacy of educating engineers and applied scientists that goes back to the founding of Columbia as King's College in 1754. Columbia alumni include John Stevens, class of 1768, whose technology made early steamboats and locomotives possible; DeWitt Clinton, class of 1786, who

shaped the history of New York City as a mayor, and as governor, was the force responsible for the Erie Canal that created a waterway linking New York City to mid-America; and William Barclay Parsons, class of 1882, who, as the chief designer and engineer of New York City's first subway system, the Broadway line, revolutionized mass transportation within the city. At the same time, as the chief engineer and designer of China's 1,000 kilometer railway route from Canton to Hankow, he may be considered one of Columbia's first global engineering leaders. And the firm he founded, Parsons Brinckerhoff, is now one of the world's leading global engineering and construction management organizations. Current Columbia Engineering alumni lead Boeing Commercial, Citigroup, and Xerox, and hundreds of other national and international companies, while others have embraced the entrepreneurial spirit and are forming successful companies, one after another.

And as we are about to welcome a new class of alumni following their graduation next week, we are also getting ready to welcome

the class of 2016. This new class has been chosen from a record breaking number of applications from the widest application pool we have ever seen, with a selectivity rate of 9.4%. Of the admitted class, 45% are women and 34% are underrepresented minorities--Hispanics, African Americans, Native Americans, and Pacific Islanders. Of this groups, 18 are first generation college.

We offer admission on a need-blind basis so that every student admitted is guaranteed to have his or her financial needs met. That results in more than 56% of our students receiving some financial aid, with an average Columbia University grant of more than $36,000 per year. And for households where the calculated income is less than 60,000, there is no parental contribution required. Our school also boosts an enviable graduation rate of 90% within four years; 96% within five years; and 97% within six years. This is all the amazing when you consider the rigorous curriculum and the many co-curricular and extracurricular activities in which our students participate.

Equally impressive is the fact that

for the students who entered in the fall of 2010, the retention rate from first year to sophomore was an amazing 98%.

Over the years, Columbia's engineering fundamental philosophy of engineering education has not changed; but the components that make up each element of pi engineering, according to phi, have been transformed by the passage of time. Beginning in the first year, our students take a required design course, we call it the gateway course, which acquaints them with each of the engineering and applied sciences disciplines that we teach, and it gives them the opportunity to work on group projects that are real-world problems. They develop substantive engineering skills as they are encouraged to think creatively, to work collaboratively, and to solve real problems. They have created a wheelchair swing and redesigned the Richard Rodgers Amphitheater in Marcus Garvey Park in Harlem.

When our students reach their senior year, they are responsible for a senior design project within their major, one that brings to bear all the knowledge and soft skills they

have acquired since their first year at Columbia Engineering. These senior design projects often result in patent applications, especially in the areas of biomedical engineering, mechanical engineering, and electrical engineering. From neonatal transport systems that prevent hypothermia to a gantry arm for victims of spinal muscular atrophy, our students actually solve real world problems, and do so in a way that improves the human condition.

In addition to the rigorous curriculum, our students are able to choose from many co-curricular and extracurricular activities that complement their education within the classroom. They can select one of hundreds of different research opportunities, some with our most senior faculty. Our undergraduate students can work on research projects from green roofs and tracking electricity consumption in the city to developing novel biomaterials for tissue regeneration and applying photonic packet switching to high performance computing.

We also offer a minor in entrepreneurship and support a vibrant

entrepreneurial spirit among the students. In fact, this year, we created a residential program, Res. Inc., a living-learning environment that fosters innovation and entrepreneurship by creating a residential community of nearly 70 engineering students interested in starting new ventures.

We offer internships and externships, some of which are international, with companies in diverse industries. And we believe that having a global experience is highly desirable for every student. Faculty-led international trips during the winter break give a student an understanding of different countries and cultures as they interact with other students and with companies around the world. In addition, many students volunteer with Engineers Without Borders. The Columbia chapter is working in Ghana, where they are concentrating on sanitation and water management; in Uganda, where they are implementing a multi-function Energy Platform pilot program that provide power for agricultural processing, electricity generation, and irrigation; and in Morocco, where they are

building two footbridges over the Tagawowt River.

The mission of our school is to educate talented students who aspire to become innovative, social responsible leaders in industry, government, and academia, students who strive to improve the human condition locally, nationally, and globally. We do this by balancing fundamental principles with real world applications, and an emphasis on interdisciplinary education and entrepreneurship.

I am privileged to be able to come before you today and to assure you that we at Columbia Engineering are preparing our students to be the engineering and applied science leaders of tomorrow. On behalf of Columbia University and Columbia Engineering, thank you for your time and for your interest in the educational future of our students.

CHAIRPERSON RODRIGUEZ: Thank you. Very impressed. My first question is how--I'm sorry. No, go, go, no, go, go, go, go, no.

CHAIRPERSON CABRERA: I do want to recognize some of the members that have joined us. All the way at the end, Council Member Seabrook,

Council Member Weprin, Council Member Jumaane Williams, Council Member Rose, and Council Member James.

CHAIRPERSON RODRIGUEZ: What improvement have you been able to make when it come to bringing more diversity of the staff of the School of Engineering.

FENIOSKY PENA-MORA: At the staff level?

CHAIRPERSON RODRIGUEZ: Yeah.

FENIOSKY PENA-MORA: We have been very professional, we have actually made significant strides at the undergraduate level, at our student level. At the faculty level, I have been trying to really diversify, we have achieved some improvement at the level of gender diversity in terms of women professors, we increase by almost 17%, even though we are growing. However, at the level of underrepresented minorities, we have not keep up with the impressive results that we have had at the graduate level--at the undergraduate level with the students.

CHAIRPERSON RODRIGUEZ: How important is for you as the president to continue

increasing diversity at staff level?

FENIOSKY PENA-MORA: I think it's incredibly important, I believe that our increases at the undergraduate level of the number of women, and like I said, this year we have 45% women that were admitted, was really influenced by the increase on the women faculty that participate in some of our outreach activities, our students are able to see some of the role models and being able to connect. Those I believe that are underrepresented minority groups students will also benefit from such representation at the faculty level, but we have not been able to achieve the goals that we would like to achieve at that level.

CHAIRPERSON RODRIGUEZ: Is that increase of staff--how does that increase of diversity at staff level have an impact, a positive impact with the student population?

FENIOSKY PENA-MORA: I believe that it does have. We have seen how some of our faculty that are very engaged on the issue of diversity attract the students and support the students throughout their career and I think it

does make a positive impact in their history, in their role model positioning and that they can actually see that they can achieve some of the things that's for sometimes that is very difficult for them to achieve.

CHAIRPERSON RODRIGUEZ: Great. What about, like, I mean, you just highlighted a number of important research that the School of Engineering been doing, how does those research will benefit the city of New York?

FENIOSKY PENA-MORA: There are quite a few particular projects that work very closely with the city. For example, we have one of our faculty members that have been working on the nitrogen cycle and they have been looking at refuse water and seeing the impact. Like, for example, I don't know if you remember last year, there was a very significant rain and there were some waters that went untreated to the river, to the Hudson, so some of our faculty has actually been working on how to make sure that this doesn't occur again. We also have some faculty that are working on making the city more energy efficient using more green roof in order to improve

sustainability in the city. We also have faculty members that are working with introducing engineering entrepreneurship in high schoolers and middle schoolers. So there are a number of projects and like, for example, in the biomedical arena, there have been a lot of interaction with some of the hospitals in the city, not just with Columbia and Columbia Presbyterian, but others, and those actually, I believe, benefit the city in different ways.

CHAIRPERSON RODRIGUEZ: My other colleague they also have question, and I know that the time is limited for the Dean and also for the President of City College because they both have other commitments.

CHAIRPERSON CABRERA: Thank you so much, Chair Rodriguez, and welcome, Dean, it's good to have you here and it's good to have Columbia here, my son graduated from Columbia University a couple of years ago.

COUNCIL MEMBER WEPRIN: Show off.

CHAIRPERSON CABRERA: Great. He earned it. I have only a couple of questions here, number one, do you track your students, the

number of students that become educators, employ in a company, or start their own business, and can you give us a sense of where they're ending up at?

FENIOSKY PENA-MORA: Actually, that's a very good question, Councilman Cabrera. We have kept good record on the number of students that graduate and go--continue on to graduate school and we have around very much between 20% to 25% that continue to graduate school. And then we were looking at the ones that went to employment, and also we are starting to keep track record of the one that went into education. So we have between 2 and 5% of our students when they graduate, they go into education, either Teach for America or other types of not-for-profit that goes into high school and we are very proud of all those students.

The remaining go into industry. Now how they break down has been a little bit more challenging, but I can tell you that in the first year, around a third of our students go to the financial markets working with different financial institutions, and around, I would say, other 25 were to what we normally consider the [off mic]

traditional engineering.

But aside [off mic] the alums, I think that careers change over time and what we're seeing is a lot of our alums when they are 20, 30 years out, they think to be more in the management position, leadership position, investments positions, and even the ones that are in industry, they are kind of CEO and on that level.

CHAIRPERSON CABRERA: I hear in your testimony or you sure earlier--

FENIOSKY PENA-MORA: Yeah.

CHAIRPERSON CABRERA: --that a lot of the students, a lot of minority students and women are not continuing to graduate education. What's, maybe you have anecdotal or if you have done a survey as to why a lot of them do not continue on to graduate school?

FENIOSKY PENA-MORA: I think for our case, I don't think I recall saying that--

CHAIRPERSON CABRERA: Oh, okay--

[Crosstalk]

FENIOSKY PENA-MORA: --our students do continue and I would say proportionately.

CHAIRPERSON CABRERA:

Proportionately--

[Crosstalk]

FENIOSKY PENA-MORA: -- proportionately to what our students are doing. One of the things that we did in order to increase the ability is we have created express admission process for our students to go into the masters program, so that is with less are requirement themselves taking the GLE [phonetic] and going through many hoops, it's a lot easier, so we are seeing a little bit of an increase on that.

CHAIRPERSON CABRERA: My last question, we hear of a couple of colleges-- Roosevelt Island and another place--

FENIOSKY PENA-MORA: Yes.

CHAIRPERSON CABRERA: --coming in, how do you see that affecting your application pool? Is that going to enhance other engineering schools around the area or how do you see the future here?

FENIOSKY PENA-MORA: I think I see the future very bright. If we, the city is intelligent and it's strategic on how to tap the future. I believe that the Mayor's call for

increasing the number of technology and engineering professionals in the city and his position that engineering science and technology skill to the future of the city moving forward is going to be a game changer.

I really second that, I think this is critical, the approach may be a little bit questionable on how we see the approach, but I think the idea definitely is important. But I believe that this position and this buzz that has been created has really positioned New York City as a place where engineers and technologies see themselves in making a magnificent impact.

CHAIRPERSON CABRERA: You said the approach is questionable, can you explain a little bit as to what you mean by that and what approach do you suggest?

FENIOSKY PENA-MORA: I--

[background noise]

CHAIRPERSON CABRERA: --the spot, you don't have to answer the question.

FENIOSKY PENA-MORA: Okay. I don't have to answer that question, yeah.

CHAIRPERSON CABRERA: Thank you so

much.

FENIOSKY PENA-MORA: Thank you for letting me out of the hook.

CHAIRPERSON CABRERA: Okay. Thank you so much for the great--

FENIOSKY PENA-MORA: Thank you.

CHAIRPERSON CABRERA: --work that you're doing.

CHAIRPERSON RODRIGUEZ: Council Member Williams.

COUNCIL MEMBER WILLIAMS: Thank you, Chair, and thank you, Dean, for your testimony. Just really brief and people might get mad at me, but I got lost a little bit in your pi versus phi explanation--

FENIOSKY PENA-MORA: Yes.

COUNCIL MEMBER WILLIAMS: --is that the name of the school?

FENIOSKY PENA-MORA: No.

COUNCIL MEMBER WILLIAMS: Okay.

FENIOSKY PENA-MORA: The name of the school is Columbia Engineering.

COUNCIL MEMBER WILLIAMS: Is that the motto?

[Crosstalk]

FENIOSKY PENA-MORA: [Interposing] The motto that we use. Pi according to Phi.

COUNCIL MEMBER WILLIAMS: Okay. I do the--I got a little lost, I just want you to--

[Crosstalk]

FENIOSKY PENA-MORA: Okay. It's just we make a reference of how we educate our engineers.

COUNCIL MEMBER WILLIAMS: Okay. And how long have you been dean?

FENIOSKY PENA-MORA: I have been dean, it's going to be three years in July.

COUNCIL MEMBER WILLIAMS: So and I understand that when you got it, it was 21st in the nation, now it's 15th?

FENIOSKY PENA-MORA: Yes, at the graduate level.

COUNCIL MEMBER WILLIAMS: Congratulations, I'm sure any school would love to have it, it's a fantastic record.

FENIOSKY PENA-MORA: Thank you.

COUNCIL MEMBER WILLIAMS: What were some of the things that you did to help move that

forward?

FENIOSKY PENA-MORA: Well there are different components, I think one was communicating better the value proposition that we bring to our students and making sure to develop programs that will make us competitive across some of the established institutions in engineering in the nation that people normally think as being among the top, and we have developed a number of programs that actually allow us to compete head to head to attract some of the students that normally will go to the institutions now to come to Columbia.

COUNCIL MEMBER WILLIAMS: Well congrats, I'm sure, as I said, any school would love to have you and--

FENIOSKY PENA-MORA: Yea.

COUNCIL MEMBER WILLIAMS: --what you bring there. Just really brief, we're trying to, I guess, maybe rephrase, do you think the Mayor's approach is respectful of the engineering schools that already exist?

FENIOSKY PENA-MORA: I think they're having a lot of discussions about that, I

think that definitely now we are working all of us together and, as the Mayor has said, there's not only one winner, I think there is a clear understanding that for the type of impact that is needed for the city, we need to actually pool all the talents and support some of the system institutions that have been doing very well and I think in the, as we have seen and when you got another of the awards and I believe that Columbia is also in discussions.

COUNCIL MEMBER WILLIAMS: And do you think--so do you think his approach has helped, hurt, or remained the same for the current engineering schools that have exist?

FENIOSKY PENA-MORA: I think at this point, I think that the beginning was a little bit challenging because of the way that the information was assimilated and the perception that New York needed somebody from outside in order to be able to support the needs of the city. I think that created significant discussion in different venues, but I believe that now under current approach, I think everybody will benefit.

COUNCIL MEMBER WILLIAMS: Thank

you. Looking forward to your continued great work at Columbia.

FENIOSKY PENA-MORA: Thank you.

CHAIRPERSON RODRIGUEZ: Debbie Rose.

[Pause]

COUNCIL MEMBER ROSE: Hi, Dean.

FENIOSKY PENA-MORA: Hi, how are you?

COUNCIL MEMBER ROSE: How are you?

FENIOSKY PENA-MORA: Council Member Rose.

COUNCIL MEMBER ROSE: Thank you. STEM--

FENIOSKY PENA-MORA: Yes.

COUNCIL MEMBER ROSE: --STEM programs is very important to me, and so what are you doing to connect with the public schools and STEM programs?

FENIOSKY PENA-MORA: I think that's a very good question, and we have had traditionally a lot of interaction with different public schools in the city and benefiting from our connection also with Teachers College, so

sometimes we go together, Teachers College, looking at educational pedagogy components and we're looking at the STEM and engineering. We are very interested introducing the engineering concepts early.

One of the things that I have been trying to accomplish is to really go and integrate better at the middle school level because I feel very strongly that the 6th grade is a very important grade in which determines the path that students will take in terms of STEM. Because up to 5th grade, they are taking more or less the similar math, everybody, so everybody has not been differentiated, but in 6th grade they start taking path on different math, different sciences and I think we need to start talking to kids at 5th grade and make sure that we support the selection of math and science on the 6th grade going forward. So we are trying to target more the middle school, we have been working a lot with the high school and a lot with the primary school, but I think the middle school is critical.

COUNCIL MEMBER ROSE: Do you work in collaboration with them on the curriculum?

FENIOSKY PENA-MORA: There are some components that we work, there are after school programs and there are some interactions in which we have a program that is funded by GE, General Electric, jointly with Teachers College and we have Ph.D. engineering students that work with teachers in their school in trying to introduce better contextualized math and science concept. Because sometimes the way that math and sciences teach is very much as an individual concept with other relation on how to apply it and what we are trying to do is to provide the context of the application so that students feel excited about it.

COUNCIL MEMBER ROSE: I'm sorry, one of my colleagues wanted to know what the acronym STEM was, it's Science, Technology, Engineering, and Math.

FENIOSKY PENA-MORA: Math, yes.

COUNCIL MEMBER ROSE: Do you think that the increase in tuition rates are going to impact qualified and talented students' ability to attend engineering schools?

FENIOSKY PENA-MORA: What we have

seen, and that was a number that I did not present, 18% of our students are first generation students and I feel particularly very proud because I was one of the first generation students, because a lot of students see engineering as a profession that once they finish they can work and we have made it very assertive that the [off mic] that we want to support the best mind, doesn't matter what the financial needs are. So I believe that we have to monitor costs, but not costs alone but also financial aid and I think that's the two side of the question that we have to look at.

COUNCIL MEMBER ROSE: Okay. And are there special scholarships available for minorities, disability, students with disabilities, LGBT, protected class--classes?

FENIOSKY PENA-MORA: At Columbia, we don't have those because ours is total financial need so we don't give a scholarship for merit because we believe that all our students are meritorious--

COUNCIL MEMBER ROSE: Okay.

FENIOSKY PENA-MORA: --we just

fulfill all their financial needs. And so our admission office and our financial aid offices are totally separate and they do not cross-referring any information. Once a student is admitted, the names are submitted to the financial aid office which create the packages, and the packages will fulfill all their needs for the four years.

COUNCIL MEMBER ROSE: Great. And my last question is have you looked at a pool-- looked to transitioning people, people who are transitioning in their careers as a pool that you might pull from for students?

FENIOSKY PENA-MORA: Our education is very much what we call the traditional students, like the 18 to--

COUNCIL MEMBER ROSE: Okay.

FENIOSKY PENA-MORA: --24 and we do not really have the students that are very senior. However, there is another school in Columbia that is called the general studies, which actually draw upon that pool. We are one of the schools that have the highest number of veterans in our school and they do take some of our classes in engineering, some of them pursue engineering. But

it’s not that our School of Engineering pursue those students, those are students that pursue by our GS and they have the staffing and the resources needed for that more mature students because, as you remember, these are students, for example, we have ballerinas that after they have passed their prime, they go back to school and wanted to continue on other types of profession. These students are not like 18-years old, they require different type of advice and different type of interaction because they are more mature. So our school of general studies provide that type of support.

COUNCIL MEMBER ROSE: Thank you so much, Dean.

FENIOSKY PENA-MORA: You're welcome.

CHAIRPERSON RODRIGUEZ: Council Member Brewer.

COUNCIL MEMBER BREWER: I remember when you started, I think you should take over Department of Education, so…

FENIOSKY PENA-MORA: Thank you.

COUNCIL MEMBER BREWER: 'Cause you

got the personality and the curricula. I have two quick questions, one is--and if this came up before, the chairs will let me know, but the City Council, I certainly helped started this Urban Advantage program, which is in a sense STEM at the middle school level. Are you in touch with that program or have you ever heard of it?

FENIOSKY PENA-MORA: Actually, this is the first time that I hear about it, and I will--

[Crosstalk]

COUNCIL MEMBER BREWER: [Interposing] That's what I was afraid of.

FENIOSKY PENA-MORA: --and I will love to see how we can connect because we do want to support at the middle school, that's where we feel is the key important time.

COUNCIL MEMBER BREWER: Okay. And I think it would be great, the Urban Advantage is City Council, DOE, and other funding, American Museum of Natural History is the lead, but every scientific institution in the city is involved, that's the short version.

FENIOSKY PENA-MORA: Okay. I will

find out more.

COUNCIL MEMBER BREWER: And I think it would be great for you to be involved.

FENIOSKY PENA-MORA: Okay.

COUNCIL MEMBER BREWER: 'Cause the second question I have is once people graduate, do they stay in New York City? And the reason I ask this 'cause every time we have a hearing on the issue of tech, which is what I know best, but other STEM-related topics, the number one question is we can't find any engineers. So my question is do people stay or do they go other places or is that not something that you track?

FENIOSKY PENA-MORA: Actually we do track, we do see that almost all our students like to stay in New York. Sometimes I make fun when I say it's almost like the New Yorker view of the world, you see New York, you cross the river, and New Jersey and everything else start to disappear.

COUNCIL MEMBER BREWER: That's correct, you're absolutely right, we believe it wholeheartedly.

FENIOSKY PENA-MORA: Yeah. So but what I do notice is that I can tell you, and

that's one of the things that I have done during my three years is that the financial markets or the financial companies, they are good at recruiting, I can tell you when they come, they come the night before, they bring, I don't know, 10 or 14 of their employees that are alums from the same institution, they give them very good dinners, very good--they talk very nicely and the next day, when they offer jobs, they can offer 20 at once, you know, they actually create that buzz in the environment. So a lot of the students feel attracted, remember there's a little bit of peer pressure.

So one of the things that I have done is try to counterbalance that because I say that if one of our students go to the financial market because that's what they want to do, we are going to support them; but if one of our students go to the financial markets because they feel there is no other alternative, I do have a problem with that. So for example, I have worked with Boeing Corporation and I talk to them and I say, listen, you have to change your approach to recruiting here, you need to learn of the

financial markets and consulting companies. So Boeing is now doing the same, they fly quite a few people, give very nice dinner, good food, and hire quite a few students at once. Like, for example, they normally make 20 to 22 offers and very fast turnaround. Before, they used to take a little bit longer. So we are trying to continue to do that, to really increase the connection between company and student.

So to try to answer you, our students like to stay here and most of those engineers, a lot of them that stays here goes to the financial markets, but I think now with the startup scene, we--

COUNCIL MEMBER BREWER: [Interposing] Yes, that's what I'm asking about.

FENIOSKY PENA-MORA: Yeah, the startup scenes we are seeing more. So for example, we did for the first time a startup career fair and it was very, very well attended and so we are also bringing a lot of our startup alums that are doing a startup to come to campus, talk to the student so that they see that this is something that can be attractive, so we are seeing

a little bit more of a balance.

COUNCIL MEMBER BREWER: Okay. Thank you very much.

FENIOSKY PENA-MORA: Thank you.

[Pause]

COUNCIL MEMBER WEPRIN: Yeah, thank you. Good afternoon, I just have a very quick question. On page four of your statement you give some statistics--

FENIOSKY PENA-MORA: Yes.

COUNCIL MEMBER WEPRIN: --are those statistics with respect to just the engineering school or is that for all of Columbia?

FENIOSKY PENA-MORA: That's just the engineering school.

COUNCIL MEMBER WEPRIN: It's very impressive that you have 45% women in the admitted class.

FENIOSKY PENA-MORA: In the admitted class.

COUNCIL MEMBER WEPRIN: Because, as you said in your statement, it's difficult to get women to go in this direction so I want to congratulate you. You also have 18%--34%

minorities and 18% first generation--

FENIOSKY PENA-MORA: Yes.

COUNCIL MEMBER WEPRIN: --those are impressive numbers, thank you.

FENIOSKY PENA-MORA: That stay in engineering. Yeah, and actually I normally talk to my colleagues in the other Ivies and they are very envious of our percentages.

COUNCIL MEMBER WEPRIN: Yes, I can see why.

COUNCIL MEMBER BREWER: Like I said, what his new job should be.

CHAIRPERSON CABRERA: I'm sorry, what's I.B.?

FENIOSKY PENA-MORA: The Ivy League.

CHAIRPERSON CABRERA: Ivy, oh, I'm sorry.

FENIOSKY PENA-MORA: Ivy, sorry.

CHAIRPERSON CABRERA: Sorry.

FENIOSKY PENA-MORA: Ivy League, yes. There's others in the other places.

CHAIRPERSON RODRIGUEZ: So New York City is in the house 'cause like we had, as I say,

Feniosky Pena-Mora for a New Yorker, now we're going to be--thank you for your leadership and, as you know, that you make all of us so proud. And now we're going to be calling our president of City College, another New Yorker from Brooklyn--

[Crosstalk]

CHAIRPERSON RODRIGUEZ: So now I'm going to be calling, the next panel is going to be composed by Dr. Lisa Coico, Joe Barba from the Dean of the School of the Engineering at City College, Ardie Walser, the Associate Dean, and Jeremy Cortez, student.

[Long pause]

DR. LISA COICO: This on? Hear? Okay. Council Member Rodriguez and Cabrera, and all of the Council Members, it is truly a pleasure to be here today. I want to thank you for giving us the opportunity to talk a little bit about the programs for our undergraduate students and our graduate students.

Dean Joe Barba, our student, and Ardie Walser will be talking a little bit about how we--they'll be talking a lot about how we prepare our students. What I'd like to talk about

is a little bit of the advantages of where our students will be going and the kinds of opportunities that are going to be available.

On April 23rd, as you know, Mayor Bloomberg announced the launch of the Center for Urban Science and Progress, or CUSP, to be established in downtown Brooklyn. And for City University and the Grove School of Engineering, the Mayor's proposal and those campuses actually have been very advantageous to us. City College was part of the Stanford proposal and partnership and I must say that, as a result of that competition, City College has a continued and sustained partnership with Stanford University. We're sending our first cohort of students to Stanford this summer to participate in research with faculty members at Stanford, we are launching an entrepreneurship curriculum at City College which will be taught with and along with Stanford faculty, and we are also looking at joint degree programs, which will be tremendous for our student body.

In addition, as a native Brooklynite whose dad still lives in Sunset Park,

Brooklyn--

[Off mic]

DR. LISA COICO: Thank you. Brooklyn is always in the house. I love Brooklyn. This applied research institute that was a proposal between NYU, New York University, and Poly Tech Institute of NYU, New York-Poly, was developed in collaboration with corporate partners and world-class universities, including the City University of New York and the Grove School of Engineering.

CUSP is going to confront the array of challenges facing cities today, including infrastructure issues, energy efficiency, greenhouse gas emissions, transportation congestion, public safety, public health, natural resource management, communications, security, housing, and the education. New York City will, in effect, function as a living laboratory for CUSP researchers and great opportunities for our students.

Steven E. Koonin, former DOE Undersecretary of Energy for Science, has been appointed as its director. The academic partners

for NYU and NYU-Poly are Carnegie Mellon University; as I said, the City University of New York; the University of Toronto; the University of Warwick; and the Indian Institute of Technology in Bombay. In addition, there are a myriad of corporate partners: IBM; Siemens; National; Arup; AECOM, who I must say, the CEO of AECOM, the former CEO of AECOM was a City College graduate of the School of Engineering; Cisco; Con Ed; Grid Xerox; and IDEO.

When we talk about City College and the Grove School of Engineering and CUNY in general, many of our institutes and our centers are very, very much focused on urban issues and on urban solutions, and indeed, one of the themes that I have developed as the president of City College during this past year, for the entire college is the theme of urban ecology. The issue is that one cannot only look at only an engineering solution or only a health care solution, but one needs to look at a holistic approach, one needs to look at the built environment, one needs to look at the educational environment. I know, Councilwoman Rose, you talk

about STEM and the dean of engineering at Columbia talked about how we have to go from middle school, elementary school, all the way through. So it needs from our perspective at City College to be an ecological systems-wide approach, not just a single focus approach and we're very proud that we do that at CUNY as well.

CUSP, this new center, will present many opportunities for CUNY faculty and for CUNY students and for the Grove Engineering students here to become involved in collaborative research projects, to become involved educational arenas surrounding these type of urban environments. These are some of the CUNY institutes that are involved in this campus. First is the CUNY Energy Institute, which is headed Dr. Sanjoy Banerjee, who is the director and he is one of our senior and distinguished faculty members at the Grove School of Engineering. His area is clean energy, battery storage, and energy storage, trying to develop--and I'm a biologist, not an engineer, I must admit--but trying to develop batteries that can store energy in very efficient ways, you know, made of reasonably affordable cost materials. So

again, bringing down the affordability, bringing up the energy storage capability.

Another institute is the Environmental Crossroads Initiative, which is headed by Dr. Charles Vorosmarty, another distinguished professor at the Grove School of Engineering at City College. Charlie Vorosmarty is one of the world's leading experts on water quality and he will be dealing with water resources, water management, evolution of human water systems, and environmental sensing.

We have the CUNY Institute for Sustainable Cities who are part of that, Dr. William Solecki is the director and this deals with, as you know, New York City has a lot of coastal zones, coastal areas. Looking at coastal concerns, water consumption issues, and climate changes in urban areas and urban settings and how to deal with populations, population density, and the issues affecting climate change.

We also have the CUNY Institute for Urban Systems and Sustainable Building initiatives. Again, it is not only engineering solution, it is not only public health, the built

environment plays an enormous role in how our students, how our children are healthy and all other aspects, and that is headed by Dr. Michael Bobker. Again, it's the greening of commercial properties, energy, and construction management.

And we have the CUNY Institute for Software Design and Development. Dr. Ted Brown is the director, and they are developing software solutions to improve energy performance and efficiency of commercial real estate and commercial buildings.

All of those benefit our students because our students have the opportunity to work on side-by-side real problems. So it's not just a theory, it's understanding how to take the theory to practice to practical solutions that will benefit New Yorkers and New York City.

And as part of that, for myself, before I turn it over to my colleagues, one of the things that we are doing that I have started at City College as well, the majority of our students at City College are first generation. More than half of the students at City College were born in a different country, 99 languages spoken on the

campus, 153 countries represented, and we are very proud that we have model programs, our biomedical engineering program is a model program for diversity. We are working on--I have established a presidential council on inclusion and excellence and we are working on ways to improve the diversity in the representation of our faculty. Diversity, to me, brings great richness. The tapestry of having many different perspectives in the room at the same time is just beyond wealth in terms of the richness it brings to us all. And so I am launching the STEM--Science, Technology, Engineering, and Mathematics--Career Development Institute at the City College of New York. We will be utilizing our alums, many of whom have taken non-traditional routes through engineering.

We will be taking our undergraduate students, they will be probably rising juniors, sophomores into junior years, providing internships, research experience, mentoring, and guidance, and career guidance so that students who are very often first generation don't honestly know what career opportunities are available so we want our alums to come back and work with those

students. The juniors who go through the project will then become senior mentors to the junior students after them, again, learning leadership, you know, leadership in that.

So we are very, very excited and I thank you for the opportunity. I will answer any questions and then turn over the rest to my colleagues.

CHAIRPERSON RODRIGUEZ: So I mean what is the possibility that you see of a student who are the recent graduate student from the School of Engineering of bringing back, helping other student who are the freshmen that we need those support in order to increase the graduation rate? And connected to that, what is the retention rate at the School of Engineering?

DR. LISA COICO: Yeah, Joe can talk about the retention rate and do you want to talk about those, the issues? 'Cause that's exactly what we're doing, we want to engage those alumni early on and bring them back because they are the best mentors.

JOSEPH BARBA: Yeah, the--is this mic on?

DR. LISA COICO: Yep.

JOSEPH BARBA: Okay. We have a number of ways that we have alums participate with the School of Engineering. First of all, when we look at the where do our graduates go, a very high percentage of our graduates stay in New York City because, quite frankly, the majority of the incoming class come from the New York City high school and their families and their roots are here. We have very strong student organizations, Council Member Rodriguez is probably familiar with [off mic] that has an alum network of graduates from City College that do come back, they do provide funds for students to participate in conferences, local and national conferences. They also come back and have a resume writing workshop and then encourage students to apply to their companies because they then have someone in that company to help them get, you know, better treatment.

In terms of the retention rate, our retention rates in the School of Engineering is between 35 and 40%, it varies with departments, some departments do a much better job than others,

but if we look at the trend, the trend is increasing and I think that, you know, we should be somewhere in about 50, 60% within the next couple of years, few years.

CHAIRPERSON RODRIGUEZ: What about in your partnership with the different schools and [off mic] for me I think that I had some knowledge of the role that you do it in our community--

DR. LISA COICO: Yep.

CHAIRPERSON RODRIGUEZ: -- especially when it comes to Harlem, West Harlem and Washington Heights and how you work with many student club and they are really active. So--

[Off mic]

CHAIRPERSON RODRIGUEZ: --can you elaborate a little bit more like about how active is the School of Engineering working with the student before they apply to the school of--

JOSEPH BARBA: Sure.

CHAIRPERSON RODRIGUEZ: -- engineering?

JOSEPH BARBA: Sure, sir. I mean, we have a number of pre-college programs, I run one of them, the STEM Institute that brings in

approximately 150 students each summer, but we have also some of the grant funded programs by NOAA-CREST that has camps, both at the middle school and at the high school. We have outreach within the local community. Some of our student organizations also have junior chapters in the high schools and do take some of the high school students on conferences and make them aware.

If you look on the Journal of Student Research that I've handed out to you, there is probably an article there where we have reached out to women, high school female students to come in and participate in a career type of fair. We've had 500 students come in at a time and we have them all build projects, engineering projects and we work very closely with some of the high school faculty in terms of training them. Again, in my prepared remarks in the appendix you'll see there that there's an application from NOAA-CREST to have high school teachers participate in the training to bring the scientific work that they're doing into their classrooms. We have a professor Gary Benenson, who is very well-known for developing scientific

experiments that can be done in the kitchen and taught to students in the elementary schools. So we are very active in that.

DR. LISA COICO: Yeah, and I also have dedicated some of the dollars that we have to community scholars so I have presidential community scholars which are full scholarships for our students' tuition, scholarships, many of whom are STEM majors--

JOSEPH BARBA: Absolutely.

DR. LISA COICO: --and they are really reserved for our community high schools in and around Harlem, in and around City College.

We also hosted the first Lego League Robotics--

JOSEPH BARBA: That's right.

DR. LISA COICO: --competition for middle school students. It is thrilling to watch it and, as a scientist myself, I know how important it is to be mentoring students from a very young age to be unafraid of science.

CHAIRPERSON CABRERA: Welcome. I'm just curious to know, is this journal a peer review journal?

JOSEPH BARBA: No, this is a journal that we put out, I mean, a couple of years ago, three years ago, I wanted to make--we do quite a bit of research, we have a lot of centers and institutes in research and one of the features of the Grove School of Engineering is that we have and promote undergraduate research beginning at the freshman level. So what I did was I took out a research associate from one of the labs, a research lab, converted that into the director of the student research and scholarship program and the aim of this--what the charge this individual was to promote more research among undergraduates--

CHAIRPERSON CABRERA: Very good.

JOSEPH BARBA: --and so and to begin looking for these students and presenting these students the opportunity at the freshman level. This journal is just a way of highlighting some of the work that's being done by students with faculty, and it's not peer reviewed in the sense that it goes out to external one.

CHAIRPERSON CABRERA: Right.

JOSEPH BARBA: The articles do come

in, there is a group of faculty that do look at this to decide which ones to select, first of all, because we have only a limited amount of pages that we want to--

CHAIRPERSON CABRERA: Right.

JOSEPH BARBA: --publish, but also to get a sense as to the quality of the work that's being put there.

CHAIRPERSON CABRERA: Well this is great, yeah, give STEM an opportunity to start being published--

JOSEPH BARBA: Sure.

CHAIRPERSON CABRERA: --and especially for those who later on want to go into higher education and become professors, you know, that's one of the things--

[Crosstalk]

JOSEPH BARBA: [Interposing] You may want to hear from our student, Jeremy Cortez, who is a sophomore in--

CHAIRPERSON CABRERA: Oh, great.

JOSEPH BARBA: --the electrical engineering department, perhaps he can tell you a little bit about his background and, you know,

what he's--and you could ask--

CHAIRPERSON CABRERA: Sure.

JOSEPH BARBA: --him questions too.

DR. LISA COICO: And I also would like to point out that 35% of our students participate in undergraduate research.

CHAIRPERSON CABRERA: Yeah.

DR. LISA COICO: We have the largest undergraduate research program in the city.

CHAIRPERSON CABRERA: Wow, impressive.

ARDIE WALSER: I just want to add one to that also that we do have undergrad students who do--are co-authors on peer reviewed papers and--

CHAIRPERSON CABRERA: Well fantastic.

ARDIE WALSER: --we promote that quite a bit, so that's kind of like the training wheels and then we let them get into the real game and actually that happens quite a--

[Crosstalk]

CHAIRPERSON RODRIGUEZ:

[Interposing] That's great. Before he shares, I wanted to ask you one question, then we could hear from the student. In terms of green technology, it's a very difficult field for students to be able to gain employment. Has that been the sense in the last six months or the last year as compared to the previous year for students who gain all this knowledge and skills, but are they having a difficult time finding jobs in this area of engineering?

JOSEPH BARBA: It's as companies become more engaged in terms of green technology and lead certifications, they are looking now more and more for individuals that have a background in sustainability and that's why we started the masters program of Sustainability in the Urban Environment that brings together students from engineering, science, and architecture, and now because the demand is there, it's growing, we're now including students that come from the social sciences. So--

CHAIRPERSON RODRIGUEZ: Interesting.

JOSEPH BARBA: --that's an up and

coming career path and it's evolving and I think it will be something that in the future is going to be more lucrative for people.

CHAIRPERSON RODRIGUEZ: Great, I'm look forward to hearing your story.

JEREMY CORTEZ: Okay. Well good afternoon, first off, I'd like to thank both chairs and the rest of the Council for hearing my experience at City College.

So my name is Jeremy Cortez, I'm a sophomore in electrical engineering at the Grove School of Engineering and I first in high school, I was lucky enough to be part of a research oriented program where they engage high school students to go to laboratories and to work with professionals and gain some sort of research experience. That sort of sparked an interest in research fields and my passion for research started in high school. And as my search for colleges, you know, began, City College stood out as one of the top schools and, one, because it was an affordable school, and, two, because Dean Barba, President Coico, and the rest of the faculty at the Grove School of Engineering,

they've created a heavily research-oriented program, not only for graduates, but for undergraduates. And that was something that really interested me in attending this school.

And there's also not only do they provide research opportunities, they've also provided a lot of opportunities for scholarships and merit-based scholarships and I tried to take advantage as much as I could and I was lucky enough to be awarded the Kaylie scholarship and also Harvey Kaylie has also started a entrepreneurship competition at the school. And me and a couple of other friends, we've gathered a team of various disciplines and we competed into this competition.

Now for those of you unfamiliar with the competition, it is a competition for undergraduates and graduates of various disciplines to create some sort of product or software that can be produced in the real world. And so my team of all freshmen, we decided to--we promoted an affordable, refreshable Braille display. So over our first year and over the summer, we worked together to create this device.

Now, however, we competed in this device as freshmen so we hardly had any experience, you know, it was extremely based on us to actually do the work. But one thing that I'm very grateful for is the faculty at the Grove School of Engineering because they knew that we were freshmen, that we didn't take that many classes, they were very helpful in teaching us some of the methods used in engineering and we all began to realize, like, how important all engineering fields are interrelated with each other. And so just the experience of being able to talk with faculty, to talk to other peers who are in the graduate level who were able to help us, it's taught me so much.

And I now have a higher motivation in my classes because, now that I'm taking the classes that are teaching me stuff that I already learned because of this experience, I'm now more engaged in my classes, I actually want to be applied what's in these books to actual the part that I'm trying to build. And so this is--it's been phenomenal, this experience, and I am extremely grateful for the City College and

everything that they have done for me, and I don't regret anything that I have done, and I would always recommend City College as a good engineering school.

So thank you.

CHAIRPERSON RODRIGUEZ: Council Member Debbie--

[Pause]

COUNCIL MEMBER ROSE: Thank you, Chair. I want to commend you on recognizing the value of mentoring and starting it early. I was really impressed that you start early with the juniors actually. Most places don't think that there's value in having a mentor until they are a senior or getting ready to pursue their career, so I wanted to commend you for that.

I also wanted to ask you about do you anticipate that the increase in CUNY tuitions will have any type of impact negatively, primarily, on the engineering school's ability to offer or to attract talented and qualified young people?

DR. LISA COICO: I think that it is always very challenging and we are one of the most

affordable systems actually in the country, but what I have dedicated myself to is to fundraising for scholarships and so that is what I spend a lot of my time doing so that our students--and as a matter of fact, almost 60% of our incoming freshmen class throughout City College this year, pay no tuition, and 42% of City College students in all classes of the whole group pay no tuition. And so I am really dedicated to fundraising for as many scholarships and as much scholarship dollars that I can to make it as affordable as possible, and that's my attitude. But I still must point out that CUNY has one of the most affordable tuitions in the country.

COUNCIL MEMBER ROSE: Okay. And do you--because of some of the budget constraints that CUNY is under, do you see--do you have a problem keeping up with the technology, keeping the labs up to date, being able to have available the cutting edge equipment and instruments?

DR. LISA COICO: I would say that that's a challenge everywhere because technology changes every ten seconds, but what we are blessed at with City College is we have amazing, generous

alumni, and if you saw the ad in the New York Times this morning, our campaign is up to $430 million and so we have been very, very, very blessed and a lot of our fundraising actually goes toward that to ensure that our students have the absolute same access to technology as if they were at an Ivy League--and I spent 30 years at Cornell so I know what it's like. So that's what our strategy is.

And I also have to say I am very grateful to the Council because the Council has been wonderful in helping us also with our capital needs, so I thank you all.

JOSEPH BARBA: I also want to say that, you know, that's one of the--also another one of the reasons why we've been promoting undergraduate research so much because students then get an opportunity to work in research environment where faculty are able to purchase the best equipment that money can buy through their funded NSF grants or NIH grants. So, you know, a student like Jeremy was able to work on nanotechnology and use the nanotechnology for the Braille system that his team is developing, but

that was only possible because he was able to leverage the research laboratories that professors in chemical engineering and others have and were willing to extend to him to use.

So, yes, there is always, you know, a challenge for technology, but we're also leveraging what the faculty that we bring in to expose our students to the latest tools in their trade.

DR. LISA COICO: Yeah, and what I would also say is we've been very lucky, we recently, as you know, received a $10 million gift to endow the Deanship of the Division of Science and one of the stipulations in that gift was that there had to be undergraduate research as part of it.

COUNCIL MEMBER ROSE: That's great. So most of your professors do apply for NSF grants. How much would you say the school generates in NSF grants?

JOSEPH BARBA: Well external funding is about $42 million a year or so.

DR. LISA COICO: And for the college as a whole, last year, we brought in close

to $70 million in external grants.

COUNCIL MEMBER ROSE: Great, great. I'm impressed. And my last question is how long does it take for your full time and your part time students to graduate on average?

JOSEPH BARBA: Well we have the graduation is typically marked as six years, so we have students that graduate at four years up to six years. What the average would be, I would say somewhere on the order of 5, 5.5. years. And you got to understand that nationally the graduation rate of engineering program is about five years and, in our case, because students have to work many times, it's been extended a little more.

COUNCIL MEMBER ROSE: Okay. And your graduation rate is?

JOSEPH BARBA: About 40%, 40, 40--

[Pause]

COUNCIL MEMBER ROSE: Thank you so much.

COUNCIL MEMBER BREWER: Thank you all. I have a question for Jeremy, which is I think the studies show that if, as a high school, middle school, elementary school, your parents are

involved with science or medicine and so on, you go to the labs, then you have your leg up. So how did you end up knowing about research when you were younger? Even though you had the interest, still getting to the research community is not so easy, how did that come about?

JEREMY CORTEZ: Well neither of my parents like math or science, so I'm one of the few--I have a younger brother as well who I try to apply my knowledge or whatever I learn, I try to apply to him. But the reason why it started for me was because of one of my high school teachers, he's a science teacher, a physics teacher, and he started a independent student research program at the school, and so that program, because I was involved in that program, that sparked my whole interest into research. And then once I got into college, I applied for this scholarship and the competition, it just kept going from there. And now I really want to pursue into graduate studies for--

[Crosstalk]

COUNCIL MEMBER BREWER: [Interposing] Well you're all set, nobody's going

to worry about you, I tell you that right now.

JEREMY CORTEZ: Thank you.

COUNCIL MEMBER BREWER: We'll all be working for you very soon. My other question just generally is I asked earlier about Urban Advantage, is that something that you or anybody aware of or you've not heard of this middle school science program at DOE?

DR. LISA COICO: I have not heard of it. Joe?

JOSEPH BARBA: I run the STEM Institute, which works with about the majority of high schools in New York City, but also as part of the STEM Institute, we also partner with the Museum of Natural History and I'm on the board that does their pre-college program, and I believe that they've discussed is they, even though I haven't been involved with the program itself directly.

COUNCIL MEMBER BREWER: [Interposing] Okay. [Off mic] learning is generally they should make sure that they know about all the engineering opportunities.

DR. LISA COICO: Absolutely.

JOSEPH BARBA: Yeah, that's--

COUNCIL MEMBER BREWER: [Interposing] Okay. Thank you.

JOSEPH BARBA: --a critical thing.

COUNCIL MEMBER BREWER: Thank you.

CHAIRPERSON RODRIGUEZ: I have two more questions before letting you go and calling the next panel. One is, how would City College and School of Engineering benefit if the School of Engineering is part of the science and engineer in the city that the Mayor has been working that still is in progress? Which is something that I appreciate in how the Mayor, even if he already cut a DOE or make the agreement with the other institutions, still he has said publicly that he is still open in conversation to see how especially Columbia and CUNY that has shown interest on being part, it also is included. How will the School of Engineering at CUNY, at City College will benefit, knowing that this is basically the entry door for the working class student and middle class?

DR. LISA COICO: Yeah, we are CUNY, as I said, is part of the NYU-Poly proposal and

campus that's going to be established in Brooklyn. The great advantage for this for our students is that they will now have access to a wide variety of opportunity of universities, for instance. So, you know, the University of Warwick, Carnegie Mellon, which is in the Pittsburgh area. So when they're thinking of graduate school and studies, they now have network connections of faculty at a much broader group and swath of universities.

In addition, the corporate partners that are part of this also provide a link into job opportunities, and for me, it's all about anybody I think--and, Joe, you can talk about it--but it's so much about networking, it's so much about you got to get that foot in the door. Once they see how--now, Jeremy, right? I mean, it's amazing, our students are amazing. Every day I walk on this campus and I pinch myself because it's such a wonderful campus to be at and an amazing campus. That's the opportunity. They will work side-by-side with world-class faculty, not only from CUNY, but from all over the world, which gives them international experience, gives them networking opportunities and can give them direct access to

jobs and professional opportunities. This going to be wonderful for CUNY students and for City College students. Joe, did you want to comment on that?

JOSEPH BARBA: No, I agree with that benefit to our students, but also to our faculty.

DR. LISA COICO: Absolutely.

JOSEPH BARBA: Because our faculty will have collaborations with faculties throughout the world through this institution. You know, many of our faculty are very renowned in areas that this institute wants to develop. So I mean, I think there has to be a two-way flow of information and collaboration, and so I think it's only a winning proposition for everybody involved.

CHAIRPERSON RODRIGUEZ: So in the case of City College, are you okay at the level of participation that you have up to now or you be happier looking for--

[Crosstalk]

DR. LISA COICO: [Interposing] Oh, we always want more.

JOSEPH BARBA: --more.

DR. LISA COICO: You know, I don't think that--that is never a question, we are always looking for greater opportunities, greater ways to participate. And actually, I envision that happening, I envision that as it gets on the ground, we will all be very actively involved and increasing our participation.

CHAIRPERSON RODRIGUEZ: Great. I would like to end saying that I had experience, not only being as a member of the graduate student council, being a student activist in my years of City College, but also as a condition as being a teacher at the Luperon high school, I was invited many times by [off mic] and then [off mic] where they brought--every year, they bring hundreds of student for high school--

JOSEPH BARBA: Absolutely.

DR. LISA COICO: Right.

CHAIRPERSON RODRIGUEZ: --to participate in competition. So you've been doing a great work, I have no doubt that is a matter for to continue supporting your leadership above you as a dean, as a president, that we will be able to expand your knowledge to also our schools system

and--

DR. LISA COICO: Yeah.

CHAIRPERSON RODRIGUEZ: --by the way, we even have a conference on October 11 and 12th--

DR. LISA COICO: That's right.

CHAIRPERSON RODRIGUEZ: --about the role of parents in their children education that are going to be hosting a sponsor, co-sponsor also at City College--

DR. LISA COICO: Right.

CHAIRPERSON RODRIGUEZ: --and that's a way that I think that we should be looking at higher education. Higher education is [off mic] you think about the freshman student for higher institution, it's basically about from pre-K--

DR. LISA COICO: That's right.

CHAIRPERSON RODRIGUEZ: --from early child to higher education. So--

DR. LISA COICO: That's true.

CHAIRPERSON RODRIGUEZ: --thank you for your contribution and your leadership.

DR. LISA COICO: Thank you.

CHAIRPERSON RODRIGUEZ: Thank you.

DR. LISA COICO: Thank you.

[Crosstalk]

CHAIRPERSON RODRIGUEZ: Now I'm going to be calling the panel from Manhattan College, Walter Matystik and Tim Ward.

WALTER MATYSTIK: Tim Ward had to leave to go to a faculty meeting so I'll be [off mic].

CHAIRPERSON RODRIGUEZ: Okay.

WALTER MATYSTIK: Thank you.

[Crosstalk]

CHAIRPERSON RODRIGUEZ: Are there three here?

WALTER MATYSTIK: And then three others.

CHAIRPERSON RODRIGUEZ: Let me then call--no, let me…

[Long pause]

WALTER MATYSTIK: Well thank you, Chairman--

[Pause]

CHAIRPERSON RODRIGUEZ: I think microphone is off, yeah.

WALTER MATYSTIK: Thank you to the co-chairmen for this opportunity today. My name is Walter Matystik, I'm associate provost with Manhattan College up in the Bronx, I'm speaking on behalf of Dean Tim Ward, who had to leave for a end of semester faculty meeting, who was with us here earlier today.

Wanted to start off by telling you a little bit about Manhattan College, from the founding by the Brothers of the Christian Schools in May 1853, so we're almost 160 years old in 2013, Manhattan College has been an institution with a sponsoring board of trustees comprising secular independent members and representatives of the religious teaching Institute of the de La Salle Christian Brothers. It also combined excellence in the traditional liberal arts and sciences with professional and technical education in a single collegiate institute.

Our college's mission is to provide a contemporary, person-centered educational experience that prepares graduates for lives of personal development, professional success, civic engagement, and service to their fellow human

beings.

Over the past three years, 35% of Manhattan's incoming freshmen have been first generation students. Currently, around 24% of the students are from racial and ethnic minorities, with the largest percentage of those reporting classified as Hispanic/Latino. As of fall 2011, the college's enrollment was just under 3,000 full-time undergraduate students and 420 graduate students.

One hundred and twenty years ago in 1892 the School of Engineering was developed out of a science program in coordination with liberal arts. We still maintain that strong liberal arts core as part of our School of Engineering and we're very proud of that. Today, all five of the undergraduate engineering programs--chemical, civil, computer, electrical, and mechanical--and the masters of environmental engineering programs are accredited by the Engineering Accreditation Commission, known as EAC, of ABET, the Accrediting Board for Engineering and Technology, and have robust and growing enrollments. As the largest school at Manhattan College, engineering has about

870 full-time undergraduate students, 160 full and part-time graduate students, with 38 full-time tenured, tenure-track, or visiting faculty members, supported by 12 administrators and professional staff. In the fall 2011, the school's undergraduate population was about just under 20% female and 16% of underrepresented minorities. Nationally, for the same programs as found at Manhattan, these percentages were 16.2% and 16.8%, respectively, for females and underrepresented minorities.

As of May 2012, the demographics for our incoming class, which was solidified or will be solidified after the May 1st national deposit deadline for all of us here, were about 47% female and 25% underrepresented minorities in our School of Engineering. For engineering, the demographics are about 19% for females and 17% for minorities.

We are a primarily undergraduate teaching institution, but we're classified as a master's degree granting college or universities. Unlike some of our colleagues in the room, we're not a R1 research institute, instead, the faculty

members focus on the education of the students with a normal teaching load of about seven courses per academic year, but that heavy teaching load does not preclude research and other scholarly activities by the faculty members. It's reflected in the school's mission to prepare each student for a productive and rewarding career in engineering or a related profession, a mission that's consistent with that of the college and its Lasallian heritage.

We take pride in our ability to recruit, retain until graduation, and prepare students for jobs in industry, private practice, and government agencies. A recent analysis of the class of 2012 showed that about 80% of those entering in fall 2008 were registered for spring term 2012, which is a very good persistence rate. A survey of the class of 2010 conducted by the college last year showed that those answering the survey, 92% of the engineering students indicated that they had a job or had been placed in a graduate program.

We're also very proud, it has been discussed earlier by several of the institutions

and by the members of the Council, looking for involvement without reach to the high schools, we're very proud of our track record there. We promote engineering careers to local high school students. We partnered or otherwise interacted with the Bronx Engineering and Technical Academy, BETA, IN-Tech Academy, Roosevelt High up in Yonkers, Saunders Trades and Technical School, and Yonkers High School, and Riverside High School to help attract more females and minorities into engineering. Faculty members conduct summer programs directed towards females, underrepresented minorities, and traditional students. These programs are supported by the college and by the ACE Mentor Program, which originated at Manhattan College under the leadership of our esteemed alumnus, Dr. Charles Thornton, who you may recognize from the engineering firm of Thornton, Thomas, Eddy. Also supported by the New York Building Foundation and the American Society of Civil Engineers, New York City Metro Chapter.

In the interest of time, I won't give Dean Ward's full reading here today, just

some highlights. Students are encouraged to prepare themselves to participate in lifelong learning, which typically means completion of a master's degree, we do have a master's program at the college where many new cutting edge concepts and technologies are introduced to the student. The majority of the credits in the master's degree program are electives which are renewed and refreshed every year. A recent example is a brand new cosmetics engineering program working in conjunction with L'Oreal, we believe it's one of the first cosmetic engineering programs in the nation. This option was started in response to suggestions by industrial advisors and has proven to be very popular.

Our masters of engineering in environmental engineering is the only ABET accredited master's degree of this type in New York State, and only one of five such programs in the United States.

Skipping down a bit, since 1893, Manhattan College engineers have played an integral part in the building of New York City, and we're very proud of that too as well. From

robotics to the environment, computing to infrastructure design, the School of Engineering opens an incredible range of possibilities for the future engineer. The Manhattan College School of Engineering will continue to prepare ethically sound, technically competent, and ready to work graduates from its BS and MS programs with the expectation that these graduates will provide services to the larger community of New York City through traditional engineering professions, other professional opportunities, and new cutting edge technology.

Thank you for this opportunity, and I refer the Council Members to the full testimony provided.

CHAIRPERSON RODRIGUEZ: Thank you.

WALTER MATYSTIK: Thank you.

CHAIRPERSON CABRERA: I have a question, I'm curious to know, what's the faculty adjunct ratio that you have?

WALTER MATYSTIK: We have, as all schools do, a number of adjunct faculty. It's a little over 100, if I recall the data correctly, I don't have the data before me--

[Crosstalk]

WALTER MATYSTIK: --we have 205 full time equivalent faculty members.

CHAIRPERSON CABRERA: Okay. Great. And how many of your faculty happen to be at a minority group?

WALTER MATYSTIK: Not as many as we'd like. We do have minority representation. Four of our School of Engineering faculty are women, we're proud of that. I don't have the data college-wide, again, it's difficult to recruit, there is a lot of competition for those wonderful individuals who persisted against the challenges to get the Ph.D. in that career.

CHAIRPERSON CABRERA: Okay. And what about administration and in that program, how many are members of minority groups?

WALTER MATYSTIK: Again, I don't have that data available--

CHAIRPERSON CABRERA: Okay.

WALTER MATYSTIK: --we have one of our five deans is a woman, four males, our outgoing provost was an African American, replaced by a Caucasian. We have, I think a fair

representation of underrepresented minorities across the other administrative and director offices.

CHAIRPERSON CABRERA: Do you find it difficult find enough resumes from--I know it's a difficult task finding, especially when 20 something, 30 years ago, you have very few minorities that were involved in engineering. Is it the pool that you're lacking or is it getting the word out, what would you accrue to the challenge?

WALTER MATYSTIK: It varies from recruitment of position to recruitment position, we do have a very strong affirmative action officer on campus as part of our human relations office who makes it a point to meet with all of the academic search committees to promote affirmative action and that's part of--in fact, that's the initial meeting of all of the academic search committees. I think it might be a combination, we do try to reach out to nontraditional publications, Hispanic publications, various other Latino publications to try to get the word out along with the normal

traditional channels, such as the Chronicle of Higher Ed, for instance. Sometimes the pool is just not there, as you pointed out.

CHAIRPERSON CABRERA: It's been my experience in having work in private colleges, in higher education, that, as a minority member myself, that I always find myself to be like a minority minority, it's very few and yet, you know, you have a population of minorities who, many times they like to identify themselves with a role model, you know, and mentor, and it's my hope that in the future we will see more of that.

And my last question, what percentage of your undergrad minority students move on to the graduate program, do you happen to know that data?

WALTER MATYSTIK: I don't have that data, I think as someone else had testified, it's proportional to our overall population.

CHAIRPERSON CABRERA: Okay. All right, thank you, thank you--

[Crosstalk]

WALTER MATYSTIK: [Interposing] Thank you, I'm sorry I didn’t have that--

CHAIRPERSON CABRERA: Thank you. That's all right. Thank you, sir.

WALTER MATYSTIK: Thank you for the--

[Crosstalk]

CHAIRPERSON RODRIGUEZ: Now to hear the perspective of what I would do in the private sector also to help our students to be prepared, we will have from Google Alfred Spector, and from VENMO, Iqram Magdon-Ismail.

[Long pause]

ALFRED SPECTOR: Mr. Chairman and Committee Members, thank you for having me. I am Alfred Spector, and I am here today in my role as Google's Vice President of Research. I am a computer scientist. I'm also a member of the U.S. National Academy of Engineering, I've been a university professor, an entrepreneur, and an executive at IBM in both product and research roles. I reside in this region and I work out of our office, along with 3,000 colleagues that are here in New York. As an international company, we, of course, do research and engineering in many locations, but our New York City team, as you may

have heard, is our second largest, and it's based in the old Port Authority building in Chelsea, which we own, and you may know it as one of the few largest office buildings in New York City. In 2011, I think our growth is material to the region, we added 750 people in our New York office and we continue to hire actively.

The primary goal of research at Google, and in fact in many places, but we're trying to advance computer science. At Google we're trying to make continuing progress on our fascinating mission, which is to organize all the world's information and make it universally accessible and useful. As just one example of our work, we focus hard on developing techniques to allow machines, not only to understand documents and images and videos, but also to understand consumer's goals in locating and understanding information. But our team, even our teams in New York, have worked on translation, speech recognition, auction pricing, and many other interesting projects.

One thing you can count on, and I think it's extremely important to the future of

this city, this advanced city, is the power of personal devices, networks, and so-called clouds of computational resources to which they connect will continue to grow in capability and availability. And simultaneously, the cost is going to continue to decline. Computational clouds of computing, over time, could contain billions of processing elements, giving almost everyone on-demand access to computing capabilities that were almost inconceivable ten years ago.

In a quick search while writing this testimony, I found many Android tablet computers on the web that go now for less than $75.00, and that's less than many textbooks, yet capable of storing very many textbooks. This continuing growth in computational power will remain the underlying fuel for vast increases in technology and computer science.

More importantly, the impact on this technology will continue to be very societally, even by the standards to which we've been accustomed. So things are not slowing down, they're only accelerating in their impact on

society. Computers have benefited most every aspect of life, but now, even in areas we thought were somewhat far afield and they are being impacted.

I talk commonly about the mathematical formulation, CS plus X. What I mean by that is Computer Science plus X for all X, every discipline, is going to be the nexus of innovation. To me, that means that every discipline will be increasingly impacted by computing and computer scientists will increasingly be part of a much more interdisciplinary world, not just the people in the basement writing code.

I want to just give you a fun example, you've heard a lot of people talking, but I think you'll find this enjoyable, and this has been based on work we've been doing to support work in computer science plus X being the Social Sciences. Lieberman and Michel--two folks at Harvard--termed this Culturomics. It's the mathematical analysis of cultural trends. The screen image, which is on probably the next page of your document, I took it this morning from a

publicly available tool called the Google Ngram Viewer, and it shows the results of counting the occurrences of 2-Grams--words of length two--in fact, the word the Big Apple, capitalized Big, capitalized Apple, in the corpus of many millions of books that we scanned from 1900 to 2010. and what you'll note if you look at the chart is that the prevalence of the term Big Apple takes off--does anyone know when that's not looking at this? Those of us that are New Yorkers, we took off in the mid-1970's and that's because there was a large campaign to publicize that nickname for marketing reasons for New York City. So it's an interesting thing, it conveys exactly what's happened in the world very effectively.

Now for the problems we have at Google, innovation requires a very thorough grounding in engineering and the computer sciences and a passion to innovate. Very roughly, the degrees of all our scientists and engineers are very well balanced among Ph.D., masters, and bachelors levels and that represents--those advanced degrees represent the challenging nature of our problems. The vast majority of the degrees

are in engineering, including computer science. Just to give you a specific, I checked and in six of the major universities in the areas, by no means all the universities in the area, but if you look at Columbia, Cornell, NYU, Princeton, Stonybrook, and Yale, in the New York Metro region, we have hired 150 and 200 Ph.D.s, masters, and bachelors respectively across Google in those areas.

We hire a lot of interns, which I think is exceedingly valuable, in fact, I lead that program which is ranked number one in the nation fro intern programs and these are, by the way, not the unpaid internships that we saw in the press recently, these kids get more money than I did when I was an intern. We've hired more than 1,200 interns for 2011 in the United States and North America, there'll be more than 150 in New York City, and 90 of our interns in the United States are from the aforementioned six schools.

So given all this as perspective, this sort of unbridled enthusiasm that I and my colleagues share for the future of technology and the great import of engineering and computer

science, I have a few things that I think about when I talk to universities about engineering education--and I do quite frequently.

First, I emphasize broadly that talented graduates will land jobs that are challenging, remunerative, and beneficial to the world around them. There is fundamentally no limit whatsoever as to what information technology can provide to mankind. Information technology is not governed by the laws of thermodynamics, so there is actually no limit on what we can conceive of doing. And hmm?

[Off mic]

ALFRED SPECTOR: Yeah, right, there's no issues like that. So in fact, we don't really know what the limits are with this technology, but they are very high and they're seemingly limitless.

While there were concerns in the early part of the decade, I bet if I had been here ten years ago, you would have asked me about off-shoring, there remains clearly a growing need for talented engineers in this country. And in fact, it may be because there has been off-shoring,

which allows for economies in some aspects of the development lifecycle and it's may be very good for the entire world. And the evidence is growing enrollments and graduations. Another example--I just happened to have been on the Harvard visiting committee, so I know some of this data--even at Harvard, which is thought of as a quintessentially liberal arts school, the number of majors in Computer Science and Engineering has more than doubled in the past five years. So this is a really important and good field for students to go into and we need to encourage it.

So that's my second point, I think universities have to make much greater efforts to encourage new types of students to enter these engineering-related disciplines. When the right introductory courses are given, more students, including women and members of minorities that are underrepresented in the field, will realize the breadth and excitement of the opportunities. As our field can only reach its full potential if we have a variety of perspectives from people with diverse backgrounds. I became a computer scientist, not 'cause I planned to do that when I

graduated high school, but because actually I wanted to be a journalist and the right thing to study was economics for that and economics required math and math had programming in it. And I was a good programmer, and also I liked the money I made working in summers. So, I applaud the movement in many computer science programs to make introductory courses better and more accessible, and this can be done in the other engineering disciplines as well. And there is a movement to that and that's part of the reason I think enrollments are going up.

Third, and this is a somewhat different perspective than you perhaps got from the other folks that talked earlier, it wouldn't have been primary on the mine, I really emphasize the duality of educational goals that our universities must provide. On the one hand, it's essential that they educate all students with enough science, technology, engineering, and math so that all can partake of an ever-more technical world. For example, I'm a very strong believer that a large percentage of students should consider computer science as a minor, even if they

go on to be pre-med or lawyers or perhaps politicians or political science majors, I think it's a perfectly good thing to do and that's an excellent hybrid. But on the other hand, the other part of it is we do have to train specialists who will be at the core of the field and who will be deep and of the utmost excellence. The field will clearly reward those who are well-trained and hardworking. And I might add that at all these schools that we heard from and the ones that I know as well, a rigorous college and graduate degree in engineering and computer science will not provide too much time for goofing off. It is a rigorous degree.

Fourth--and only six, so don't worry, I won't go on all day here--fourth, I'd like to suggest that all our educational establishments pay great attention to integrating computational approaches, and engineering modes of thinking into the curriculum of almost every discipline. So if you go back to my premise that CS plus X, Computer Science and maybe engineering and every discipline, bioengineering, et cetera, is going to be the nexus of innovation and

critical for our region, then it only makes sense that students in every discipline have the grounding in these fields. So I think it's extremely important to actually include in the curriculum, not just word processing, that's minor in importance, but really understanding a little bit how to program and understanding the great capability of these magnificent machines, and I think it will be valuable in English and in literature and in history and every field. Again, going back one last time to Harvard, I think the reason Harvard created a School of Engineering and Applied Science is it realized it needed a larger role of engineering and the applied science and all the undergraduate programs.

Fifth, I'd like to emphasize the role of innovation and entrepreneurship--you heard others talk about that. Engineering and computer science are about inventing the future, that's what we feel we are doing, so students should become involved in fundamentally new and exciting opportunities throughout their education. The Robotics League was mentioned for middle school kids, one of mine was doing it just this summer,

or just this earlier spring, I guess. And similar activities in middle and secondary school and then student projects, internships, and the like, these are critical to the education of our students. Our universities should encourage this energy, and in fact, that's the energy we think of when we think of New York City, it's the same kind of energy, the passion to do new things.

Finally, I'd like to mention something, I don't think it's been discussed so much, but that's the impact of information technology on education itself and the important role engineering schools should have in being the leaders of that. I'd like to encourage our universities to participate actively in the advancement of the use of information technology in education to improve quality on campus, to increase the number of students that can be reached through innovative distance education, and to lower cost. Information technologies have the ability to provide educational materials now at almost low cost--think of YouTube--to connect students with each other using social networks so that you could have a student community where you

learn from other students and those students might be somewhere far away, not even in Manhattan here, and perhaps in another country, in fact. And there's the ability to do personalization that cannot be done in the traditional classroom using computer techniques of machine learning that provide effectively what we used to refer to as mass customization of education.

Information technology can provide many benefits. And just as an example, Google's Sebastian Thrun and Peter Norvig taught an online course just last fall, I don't know if you saw this, but more than 160,000 people signed up to take a course on artificial intelligence, and more than 23,000 completed all problem sets in the course and got a certificate from Peter and Sebastian that they completed the course. This was more or less exactly the same course that was taught at Stanford, but of course, the numbers were vastly higher.

So why has this happened now? It's what happened is really the technologies all of a sudden occurred--tablets, video distribution, video conferencing, social networking--have sort

of all of a sudden happened worldwide, and that point of maturation has meant this will now take off, culminating in things like the new $60 million Harvard MIT program to create an open source platform for enhancing education, both on campus and providing customized distance education. At Google, we have many technologies that are extremely useful in this, for example, our YouTube videos are used by Salman Khan and one of the most effective enrichment programs for secondary school with almost the entire secondary school, science and engineering curriculum online on a collection of YouTube videos made by one man, a graduate of MIT that produced them all. And it's more watched than I believe all the videos in the University of California system. So at Google, we're very interested in this and you'll see rapid advance by the industry, as well as by us.

So in conclusion, I think the availability of a talented workforce trained in engineering and computer science is essential to us in New York. We know it's important to our sister firms in technology, but really the entire

economy. Most importantly, it's really essential to New York and I believe we need to continue to grow our capacity and quality for engineering education. We've endorsed the Mayor's initiatives, we've helped in them, and we are very involved with many activities in the city to try to promote that. Thank you.

CHAIRPERSON RODRIGUEZ: I have two questions, one is from the [off mic] perspective--

ALFRED SPECTOR: Yeah.

CHAIRPERSON RODRIGUEZ: --from you and the other [off mic] sector in the city, have you talk--have you find any concern about if the city will be ready to compete in the future with other city of the world where we have a workforce that only is getting ready and that percentage where you look at New York City public school, only 50% graduate, and from those who graduate, most of them not really college readiness.

ALFRED SPECTOR: Correct.

CHAIRPERSON RODRIGUEZ: So I mean, are you comfortable with the percentage of the student that is coming ready graduating in the case of sciences engineer, do you think that the

city and this nation need to increase in order to compete with other nation? How do you--

ALFRED SPECTOR: [Interposing] Right, so I am a strong believer that the most important thing that government can do is to make sure its population is well educated, it strikes me that's the most important thing we can do for the future. So to the extent that we can do more to improve that, we will make the region far better. So I have concerns about that in New York City, I have concerns about that in the United States, you heard my passion for getting students to go into the STEM fields which I think is extremely important. You may have seen a report by the National Academy called The Gathering Storm, which talked about this on a United States public policy level.

So I think that we do to improve graduation rates in general, to improve the number of students that are interested in doing the work to become knowledgeable is extremely important. Look, I think the Mayor's initiative looked at how many graduates do we have in science and engineering as a percentage of the economic

activity or the population in New York and if we looked at it vis-à-vis that overall size of this large metropolitan area, we were smaller than the Bay Area in California as a percentage, despite the great schools that are here and smaller than, say, Boston area, so we wanted to be larger, I think that's a good thing, so a variety of initiatives that increase our capabilities will clearly benefit the region.

We are blessed by the fact that many smart and talented people in engineering want to live here and that's why you see Google here, that's why you see Facebook creating an office here and a lot of other startups, that's a good start, but it would be better to have a larger and ever larger indigenous population of smart graduates.

CHAIRPERSON RODRIGUEZ: Does Google has any partnership with CUNY, City University of New York, the school of [off mic]?

ALFRED SPECTOR: I'm not sure about partnerships with CUNY, we have many in the city, we certainly provide many grants to NYU and to Columbia and the other schools in the region, I'm

not actually sure about CUNY.

CHAIRPERSON RODRIGUEZ: Okay. And then I will encourage and invite you look at it [off mic] because I graduated from City College, I know have been in City College, the School of Engineering, the one that graduate the [off mic] is basically student of color, I think is something that Google can be very helpful to be part of that school.

ALFRED SPECTOR: We'll pay attention to that.

CHAIRPERSON RODRIGUEZ: Thank you.

CHAIRPERSON CABRERA: As a matter of fact, he took one of my questions. I'm curious to know, are you concerned about the possibility of has been coined a brain drain of other countries recruiting students from the United States and sending students here who take up space from potentially from our students who are going to stay here and going back. As a matter of fact, I know some programs, not in engineering, but in other areas where up to 90% of students have no intentions of staying here, and do you see that same concern in your field?

ALFRED SPECTOR: I don't, really. I haven't--

CHAIRPERSON CABRERA: Why?

ALFRED SPECTOR: --seen that. Our Ph.D. programs, which I am intimately involved in at top universities recruit very heavily from overseas and a very large percentage of the students stay in America, so--

[Crosstalk]

ALFRED SPECTOR: --I am, like almost all of us here, the child of immigrant grandparents, my father was born here one year after his parents arrived, came through Ellis Island. This is the nature of America is to bring in talented people and to keep them, that's all of us are here, we hear many accents in this room--

[Crosstalk]

ALFRED SPECTOR: --so this is the nature of America, we need the talent so it's extremely important that we welcome people and then we make a hospitable environment and make it easy for them to stay.

IQRAM MAGDON-ISMAIL: Maybe I could give my testimony in response to that too.

CHAIRPERSON RODRIGUEZ: You wanted to allow him to make his testimony now or…?

[Crosstalk]

CHAIRPERSON CABRERA: Let me just finish, okay.

CHAIRPERSON RODRIGUEZ: --I think that my colleague--

[Crosstalk]

CHAIRPERSON CABRERA: [Interposing] Yeah, I got to step out and come right back in.

[Crosstalk]

CHAIRPERSON CABRERA: My other question and it's just my last question here is where do you see the future of minority engineers? Do you see it expanding? Do you see companies like yours having incentives or pathways, that's a better way to put it, to attract more minority--

ALFRED SPECTOR: Right.

CHAIRPERSON CABRERA: --members into companies like yours?

ALFRED SPECTOR: So we care deeply, I care deeply, and we'll tell you about some specifics. So first, I do believe that our industry broadly believes that diversity is not

only good for the world, but actually important for our companies, and that's best when both goals are aligned. We are a consumer company, we serve a vast and diverse population, not just in this country, but all around the world, and to think that only one type of individual can understand the whole world doesn't make sense. So we feel we need diversity and we have trouble getting it, it is a problem. We have plenty--I mean, there are plenty of minority groups that are very well represented, of course, right? We know that there are very large representations of Indians and Chinese immigrants that are very immigrants that are very well represented in technology, but there are many other groups that are underrepresented.

So we have a number of programs that we do to try to do outreach in that realm, so we have a program that we call the engineering practicum, I am actually the leader of that effort, and we bring in, let's see, this year it will be--I'm trying to remember the exact number--somewhere between 70 and 100 students and we try hard to make sure that program is particularly accessible to women and to underrepresented

minorities and we have a special program, it's a paid internship like our others, but we have special--it's a special program for younger students that we think have talent, but not the experience that would get them into our broader internship program. I'm happy to say it's extremely successful.

CHAIRPERSON CABRERA: Oh.

ALFRED SPECTOR: And we actually find that the number of students that go from that program into our regular program the following year is very healthy, I mean, it's surprisingly healthy. So I think there's a strong motivation, I'm not sure about the small startups whether they can have the time to go do this, but the larger companies like ourself and, certainly, IBM was this way, really do care about this.

CHAIRPERSON CABRERA: Okay. And I want to thank you for Google Translator, it saves me many times, and for Gmail, thank you so much.

ALFRED SPECTOR: You're welcome, I'll--

CHAIRPERSON CABRERA: Thank you.

ALFRED SPECTOR: --convey that to

the--

[Crosstalk]

IQRAM MAGDON-ISMAIL: Okay. Well if you could be present for my testimony, I'd appreciate it.

CHAIRPERSON CABRERA: I'll be right back--

IQRAM MAGDON-ISMAIL: Okay.

CHAIRPERSON CABRERA: --I have to make a phone call.

IQRAM MAGDON-ISMAIL: Well I'll begin. So my name is Iqram, well first, I want to say, Google, I have deep respect for Google, I'm an early--we're a very early stage startup, I work for--I started a company with a friend called VENMO, and we recently moved to New York and we've been around for about two years. So we learn a lot of Google, we run on a lot of Google software and it's a surprise, and a wonderful surprise to be sitting next to you, so thank you.

ALFRED SPECTOR: You're welcome.

IQRAM MAGDON-ISMAIL: Every engineer deserves a chance. I consider every school an engineering school, and I believe money

can help engineers innovate. To help New York City engineering schools prepare their students for the future, I propose that we start an institution in Manhattan called the International Institute of Technology, also known as the Institution. The Institution's motto could be nutritious creationis, which translates to foster creation, and its mission could be to endeavor to provide the best resources to every individual. Here are some suggested lyrics for a school anthem. We could sing it together if you want, your tie is inspiring. [Off mic] Listen with your eyes, your ears, and your heart; Immerse yourself, in the works of your art. Listen and realize, what's true to your heart; We all come together, for the betterment of art.

I will now suggest some inaugural principles for the International Institute of Technology, which can be amended and enforced by a group of individuals the New York City Council deems capable. Number one, a board of trustees must be appointed to govern the Institution. This board must appoint a president of the Institution and assign the president with clear duties and

responsibilities.

Numeral two, the Institution must aspire to be substantially endowed.

Numeral three, the board of trustees must continuously employ a faculty of mentors, such as computer scientists, chemical engineers, electrical engineers, writers, philosophers, designers, musicians, dancers, servers, researchers, socialites, psychologists, anthropologists, architects, carpenters, fashion people, historians, politicians, financiers, statisticians, physicists, chefs, painters, actors, athletes, lawyers, and doctors to help facilitate thorough learning and creativity.

With an International Institute of Technology built upon the three principles outlined above, I think we can help students in New York City realize their full engineering potential. That statement is inspired for Microsoft's mission, which is referenced below.

Here are some specific ideas I have that may help students prepare, which would align nicely with the Institution's mission. Number one, provide unrestricted, fast and free Internet

connectivity and computers with headphones and Spotify access, or access to a comparable music service that can be rented for free, wherever possible in New York City such as schools, households, libraries, recreation centers, public parks, and other public facilities. In certain facilities, allow students to work and listen 24/7.

Help students afford healthy nutritious food, because good nutrition leads to good engineering.

Build a public technology museum that showcases cutting edge technology advancements such as robots, spaceships, electrical cars, artificial hearts, and cancer and other disease treatments.

Host free technology talks for the public and invite speakers from around the world.

Put well stocked Kindles or similar devices in libraries and allow them to be checked out.

Build public centers for creation where groups of students can use the tools provided to work on their art, such as music,

pottery, medicine, hardware, and software.

Support student-run educational companies fairly and arduously.

Number eight, build a beautiful campus for the International Institute of Technology where students and faculty can work with each other to achieve their life goals. Any person of any age can apply any number of times to be a student or a faculty member. Applicants must pay an expensive fee and submit a statement of purpose in order to be considered. New students and faculty are chosen by members of the Institution through a fair and open process judged purely by the merits.

All accepted students and faculty members are automatically given the immigration status required to travel and reside in America and they are granted equal access to every resource made available by the institution such as research laboratories, athletic facilities, mentors, music rooms, dance halls, conference rooms, classrooms, audio engineering tools, and Internet. Curriculum, budgets, and evaluation criteria are decided by the faculty and students

collectively, and presentations of work happen periodically.

Finally, number nine, allow immigrants with U.S. citizenship status to run for President of America. This will improve New York City's chances of attracting the best engineering talent.

If we make New York City an environment where engineers can thrive off the resources we support and establish, we will further engineering endlessly and become a source of inspiration to all other cities, states, and countries in the world and, therefore, prepare New York City engineering students for the future. I hope you seek my opinion when making decisions pertaining to this subject matter.

Thank you.

CHAIRPERSON RODRIGUEZ: Well thank you. I mean, there's no doubt that we have a lot of challenge in front of us and it will take for everyone to work together to continue to make New York City the best city where sciences and engineer will make a difference. So thank you, both of you, and now we're going to be calling the

last panel.

ALFRED SPECTOR: Thank you very much.

IQRAM MAGDON-ISMAIL: Thank you.

CHAIRPERSON RODRIGUEZ: Thank you. Yash Risbud from Cooper Union, Ismati Burks from Martin College, SUNY. Is that it?

MALE VOICE: Yeah, Richard Burke--

[Crosstalk]

CHAIRPERSON RODRIGUEZ: Richard Burke?

MALE VOICE: Yeah.

CHAIRPERSON RODRIGUEZ: Yeah, Dr. Nada Anid from New York City Tech, and also a Rahmat Seoul--

MALE VOICE: Shaoureshi--

[Crosstalk]

CHAIRPERSON RODRIGUEZ: Shoureshi for New York City Tech.

[Long pause]

CHAIRPERSON RODRIGUEZ: You may begin.

RICHARD BURKE: Thank you.

[Pause]

DR. RICHARD BURKE: Good afternoon, my name is Dr. Richard Burke, and for the past ten years I have had the privilege of directing engineering programs at the Maritime College of the State University of New York. Recently I have become the director of the Global Maritime Center for Research, Development, Education, and Training at Maritime College.

Maritime College, part of the State University of New York system, serves New York City by offering relevant, applicable, career-focused education programs. Often called a hidden jewel--an image that we are working hard to change--Maritime College is the premier college of its type in the country for preparing students for careers in the global maritime industry. Our graduates include astronaut Scott Kelly; Michael Toner, the retired president of General Dynamics Marine Systems; and Captain James DeSimone, Chief Operating Officer of the Staten Island Ferry.

One hundred and thirty-eight years ago, Maritime College was founded in and by the New York City as the New York Nautical School to train students for demanding careers as ships'

officers because those officers were crucial to New York's prominence in world trade. In 1932, with the help of Governor Franklin Roosevelt, the college acquired its present day campus at Fort Schuyler, in the Throggs Neck neighborhood of the Bronx. We started teaching engineering subjects in 1908, with the arrival of our first steam-powered training ship, the U.S.S. Newport. After the Second World War, the college was authorized to grant degrees, and Maritime College became the flagship of the nation's seven maritime academies.

We now offer five nationally-accredited engineering degree programs and have more than five hundred full-time engineering students. About two-thirds of those students are also engaged in training to become U.S. Coast Guard-licensed officers in the Merchant Marine. I will tell you without false modesty that our students have built an enviable record of job placement and career success.

To the matter of how we teach engineering, let me give you these points: We educate our students to be practicing engineers, that is, to work in industry, government, or the

military, and to design, construct, manufacture and operate the things that the economy needs. While it is important to teach the faculty members of the future, practicing engineers keep the economy moving. Incidentally, these are very good jobs, and many of them are going unfilled.

Secondly, the sea is a demanding environment, and a ship is the finest engineering laboratory in the world. Our students demonstrate both learning and doing. It is necessary but not sufficient for engineers to understand theory, they must also be capable of doing what is necessary to build, design, maintain, repair, operate, and improve the systems that we rely upon. It's no accident that every major hospital in the New York area has senior facility executives and engineering managers from our alumni. If your life depends upon it, you need an engineer who can get the job done.

We work hard to use appropriate technologies for learning and doing, as well as in our professional work. We make heavy use of simulation of ships' engine rooms and wheelhouses to achieve realistic scenarios that could not be

easily or safely reproduced at sea. We are experimenting with electronic teaching materials on tablets that address the age-old difficulty of three-dimensional visualization of complex systems. As we develop more interactive materials, we are looking to bridge the gap between engineering school and lifelong learning. Often, however, there is no substitute for the real thing and we've been fortunate to receive a $1.2 million gift of a main propulsion diesel engine from Wartsila, a global supplier of power plant equipment.

We do not know what the technologies of tomorrow will demand, so to be prepared we must carefully and thoroughly teach the basics to our students. Only those who understand the foundations of their profession will be able to grow and learn as new technologies enter the state of the art. In my career, I have seen the principal calculation tool go from a bamboo slide rule to a two-pound laptop computer, but these would be useless without understanding the enduring principles of engineering science. For this reason, the STEM subjects taught in

primary and secondary schools are absolutely crucial. Algebra and physics may not be the coolest things to do, but they are the basis of our way of life and they are the keys to productive and satisfying careers.

Lastly, character and motivation cannot be neglected. Nature poses an inflexible standard of performance on engineers. If the engineer designing a bridge does not do a good job, the bridge falls down, and such an event cannot be rationalized. We have to develop the character of our students to meet such tests. Perhaps this is why engineering serves society as the entry-level profession, historically appealing to new immigrant groups and students who are among the first in their families to go to college.

Character counts in engineering. And, in spite of the heavy responsibility, engineering is both fun and creative, and when students are shown this, they become energized. As educators, this is our job too.

Thank you for this opportunity to speak.

YASH RISBUD: Chairman Rodriguez,

good afternoon and thanks to both committees for hearing us today, for the opportunity to speak on this topic. My name is Yash Risbud and I'm the Director of the C. V. Starr Research Foundation at the Cooper Union for the Advancement of Science and Art. I'm here today with my colleague, Robert Marano, he's President and CEO of InDorse Technologies, a local technology startup, which he started several years ago and hires Cooper Union alumni and students as interns throughout the year. We're here to represent very proudly Dr. Jamshed Bharucha, President of the Cooper Union, and Dr. Simon Ben-Avi, Acting Dean of the school, the Albert Nerken School of Engineering, both have previous commitments, this is our final on campus and they are taking care of several things simultaneously. Both Rob and I are alumna and adjunct professors of the electrical engineering program at Cooper Union, so this particular topic certainly is near and dear to what we both have encountered along the years.

We at the Cooper Union envision a simple goal: Provide students the opportunity for lifelong learning via, "close contact with a

distinguished, creative faculty and fostering rigorous, humanistic learning that is enhanced by the process of design and augmented by the urban setting." To that end, our faculty deliver a combination in mastering theory across key foundational engineering topics and in exercising that newly formed understanding with application to real world engineering challenges and problems.

Our classroom interaction focuses on the fundamentals of the studies of both engineering and humanities. All Cooper Union students learn that interactive and factual observation leads to problem formulation, and subsequently a problem solution coupled to what resources are available. Theoretical and applied technical courses are essential to mastering engineering, but only effective with the proper balance of humanities and the liberal arts, including topics such as art history, economics, foreign language, and poetry.

Inherent to a major portion of the engineering studies at the Cooper Union remains the interaction between academia and industry. Engineering courses taught in the latter years

rely heavily upon the application of theory to deliver tangible engineering results against clear cut specifications. Our faculty relies upon industry participation via seminars and mentorship to our students as they explore the application of theory to the real, physical world.

Engineering has been at the heart of the current technology revolution. Many of our students not only dream of being the next entrepreneurs, they are doing something about it. They apply their specific, newly learned engineering talents and balance them with learning the skills of project management, corporate financial analysis, marketing planning, staff planning, and developing pitch decks to raise capital from potential investors.

Cooper Union has also formed among its faculty, staff, students, and alumni the Cooper Union Entrepreneurs Society in order to complement and further extend the curriculum with entrepreneurial activities and seminars on seminal topics critical for any entrepreneur to understand before they expend any resources or money.

Engineering education requires a

rigorous attention to theoretical detail, the discipline to study and to make connections across disciplines, understand the application of engineering to the world around us, and ultimately interface engineering into human society. Four years remain not a sufficient time to equip our engineering students with every facet of knowledge and proven attempts to demonstrate retention, but by our creative interaction of classroom studies, industry interplay and outreach, and continued dialog with our family of engineering alumni, the Cooper Union has demonstrated to continue to deliver our students, New York City's children, ready and able to serve as contributing engineers for our city's present and future.

We thank you for your time and appreciate [off mic].

DR. RAHMAT SHOURESHI: Good afternoon, Honorable Chairman Rodriguez and members of the Council, my academic colleagues. We'd like to take this opportunity to say a few words about what NYIT is doing in terms of engineering.

And it's interesting that one of

the members of the previous panel was asking or proposing an International Institute of Technology. It's here, it's called New York Institute of Technology, we are an international institute.

As a way of introduction, I have here with me Dr. Nada Anid. Nada is the Dean of our Engineering and Computing Science School, I believe she's the only female dean in the New York City universities as dean of engineering. As a way of introduction about myself, I have joined NYIT and the city of New York for almost one year. I have had the past 31 years of experience from MIT to Purdue University to Colorado School of Mines and University of Denver before moving to NYIT, and it has been a delight to move.

And on behalf of our president Dr. Guiliano, we want to thank you for this opportunity and just wanted to highlight a few things. I know that it has been a long afternoon and you are probably tired, so I want to be brief.

A few things that differentiates what we do at the NYIT compared to probably everything else that you have heard, we are truly

a global university, which means the education we provide for our students provides them a global picture. Just wanted to share with you an example. We have campuses in six countries and we send students from New York to those campuses to gain a broader perspective. This last year, one of the students from Long Island who had never been outside of Long Island and he went to Nanjing, China, came back after about a year, and last fall his idea received the third place in the competition that's the Motorola I [phonetic], he is finishing up his engineering degree and he wants to take that technology and start up high-tech company. This is what we do at the NYIT with our engineering student, we provide them global perspective.

So when our focus is on multidisciplinary understanding; virtual teamwork, because this is the nature of business; global perspective and cultural appreciation; private-public global partnership; and more importantly, lifelong learning to keep pace with the ever-faster evolving technology.

Just one statistics, we have

currently 2,635 engineering students, about 600 of them are graduate students, we have over 70% minority, and we--our students are dominantly from the New York metropolitan area.

Given the perspective that we want to provide to our students when they graduate, they are the ones that are able to articulate global interconnectedness of issues, processes, trends, and systems. They are the ones that can apply this learning in a general knowledge as global citizen and their academic specializations as global professionals, and they are the ones that are able to adapt their own oral, written, visual, and digital communications as appropriate to different cultures; they can interact and work effectively and appropriately; and they are able to evaluate social, cultural, and linguistic diversity to develop a nonjudgmental and open attitude toward difference--this is important, especially when you are living in New York.

As a historical perspective, NYIT's forward-thinking approach to applied research is demonstrated by the fact that it was the birthplace of 3D computer animation. We had the

first patent, NYIT had the first patent on computer animation, and so there are a number of film and studios today that are working based on the technology that was developed at NYIT. We have cutting edge motion capture lab and we, in fact, we are spinning off that into a high-tech business, and we have developed the first solar home, solar electric vehicle charging station that's installed on Long Island. Numerous patents in computer graphics animation, high definition TV, packet video, Internet access system, hybrid electric vehicles, optical sensors all originated at NYIT.

Some other interesting comments, the NYIT is the single educational institution in New York metropolitan area and one of only four organizations out of 715 to receive funding from the New York State Regional Economic Development Council for technology initiatives to drive future economic growth in New York.

With partial funding from the New York State Empire State Development and a commitment from the senior administration of NYIT, the School of Engineering and Computing Sciences

is creating a new Entrepreneurship and Technical Innovation Center. This is an exciting venue and this year we will two spin off companies coming out of that center.

What makes us different also are the other programs that we have that they are all technology-based from our College of Medicine to architecture and design, to communications art and performing arts.

I would like to basically jump to one of the last paragraph and that's the one that's focusing on in terms of avenues to increase the collaborative efforts of higher education and industry require a true public-private partnership, including support from New York City government. This will inspire the city's youth and encourage its innovators to retain young talent and attract new business venture to the area. With that, I would like to stop here and be happy to answer any questions you have.

CHAIRPERSON RODRIGUEZ: I have three questions.

DR. RAHMAT SHOURESHI: Yes.

CHAIRPERSON RODRIGUEZ: One is, my

three question is how affordable is your school? What is your graduation rates? And how are you dealing with increasing more people of color into the School of Engineering? So I in looking back, when we're looking back, I know that I became aware of your school because I used to be driving a friend of mine to the--she was in the Army, so the recruitment center--the Army base is close to the school there so that's when I became aware of your school, but I before that, even when I was working in New York City public school, I didn't know that in our backyard our student had that opportunity also to be interested in your field.

DR. RICHARD BURKE: As part of the State University of New York, we charge State University of New York tuition, so a New York resident who lives on campus would pay $6,090 a year in tuition and the total bill for the year would be about $20,600, not including amenities.

The graduation rate hovers around 60%. You know, a significant portion of our student body are members of the Regiment of Cadets and there are some people who discover that they really not had--they really did not want to do

that, so it is sometimes it's an incentive and sometimes not.

We do everything we can to increase minority participation in engineering and we have been successful with respect to students of Hispanic and African American background where we are well above national averages. Where we have not been successful is in recruiting women. And clearly, since part of our program--part of many of our programs includes going to see the training ship Empire State sailed this morning with 550 students on board and by the time they come back in August, they'll have been to Portugal, Iceland, Gibraltar, and the United Kingdom.

But some students and in particular some--apparently some women don't want to participate in that and we've got to figure out how to do better at it.

CHAIRPERSON RODRIGUEZ: Okay. Thank you.

YASH RISBUD: So on the question of affordability, Cooper Union, since 1859 is still one of the probably only continual full tuition scholarship school so for 153 years, all

undergrads have received full tuition scholarships for their studies in mechanical, civil, electrical, chemical engineering and bachelor of science in engineering.

That doesn't include room and board, but--

CHAIRPERSON RODRIGUEZ: [Interposing] I thought that I heard an announcement, right?

YASH RISBUD: We've been in the news lately, and I'll let the words of both the dean and the president speak for themselves, obviously, so those are ongoing discussions with our--

CHAIRPERSON RODRIGUEZ: Okay.

YASH RISBUD: --board of trustees and the senior staff.

The graduation rate, because our admittance is so low, I mean, we admit somewhere between 6 and 7% of our applicants, the graduation rate, obviously, the retention rates are very high. I think the retention rates are in the mid-90s and the graduation rate, I believe, was 85%, the last number I saw for 2011. We'll get the

2012 number shortly, so…

Minority recruitment, I think we're no different in the sense of the challenges of going out to recruit either minorities or women. Some specific efforts that we do from the research side, I know we've got NSF grants that have some STEM components, we've got one that has a lighting studio going into some of the public schools in the Lower East Side, that's one effort that we've got into, and we annually do some work with the Manhattan Comprehensive High School, which, obviously, is completely made up of 100% of immigrants and have them come to Cooper and do a project on an annual basis. They present in front of our campus in front of our senior design team, so we have that interaction.

And between that and the press of having our full tuition scholarships obviously and the quality of the education itself, we seem to do, you know, well, but we can always do better.

CHAIRPERSON RODRIGUEZ: Okay. Thank you.

DR. RAHMAT SHOURESHI: Of course, we are private and that's always one of the

challenges, but we have over 14,000 students and it's been 70 to 75% of them, we provide financial aid. And a number of our students also understandably work so these are working individuals and, therefore, that's another way that they provide--we have very strong ties with local industry and, therefore, we place them and provide them internships, not just during the summer, this is year-round internships. So we do a number of--we take a number of approaches in order to make us affordable no matter what background they come from.

In our engineering, we have over 30% minority and we try to expand that. Also, we have a number of programs that makes us attractive to minority, especially some of the cross-disciplinary activities that we do. We have a program, I'm not sure how many folks in the New York City know, we have a program, it's about 30 years old and this is for kids with autism that we transform them to adults that feel good about themselves and actually place them in the workforce. And this is something that is a magnet for NYIT and we have, not only local students, but

the students from all over the globe that come to this 30-year old program. We are one of two that is certified for that and one of three in the country that has that certification.

In terms of our graduation rate in engineering has been [off mic] 60 to 65%, depending on the semester and depending on the working activities of the individuals. And we are one of the leaders in having interactions, initiatives, and programs, whether it's a state supported or government supported programs in the STEM area with the high school and the school systems in the New York City and the state of New York. And so in terms of increasing minority, we have an easier pipeline and access to those and that's why we will see, if you look at our trends, it has been increasing.

[Pause]

DR. RAHMAT SHOURESHI: Thirty percent, sure, sure.

[Crosstalk]

DR. RAHMAT SHOURESHI: Yep, oh, sure.

CHAIRPERSON RODRIGUEZ: --a lot of

work--

DR. RAHMAT SHOURESHI: Yep, yep.

DR. NADA ANID: Right, and attracting females remains a challenge. Female into engineer--

[Crosstalk]

CHAIRPERSON RODRIGUEZ: [Interposing] Yeah, so I just think that, first of all, thank you, the last panel and everyone that has been in our in this hearing that would be together with the Technology Committee. And as you know, like, we're looking to the future, more, this meeting is about today, it's about 50 year from now, 100 year from now. So no doubt that we can turn our city into the best city with the best program, the School of Engineering, science engineer, and engineer and it's up to us to decide which role we're going to be playing this, okay?

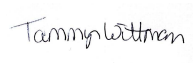
Thank you, and this meeting's adjourned.

MALE VOICE: Thank you.

[Gavel]

C E R T I F I C A T E

I, Tammy Wittman, certify that the foregoing transcript is a true and accurate record of the proceedings. I further certify that I am not related to any of the parties to this action by blood or marriage, and that I am in no way interested in the outcome of this matter.

Signature 

Date _May 25, 2012_