



The New York Times

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Published: April 12, 2013

April 12, 2013

Building a Better Tech School

By RICHARD PÉREZ-PEÑA

IF all the hopes and hype are warranted, a nondescript third-floor loft in the Chelsea neighborhood of Manhattan offers a glimpse of the future, for New York City and for Cornell University. In truth, it doesn't look like much — just cubicles and meeting rooms in space donated by Google. But looks deceive; here, with little fanfare, Cornell's new graduate school of applied sciences is being rolled out.

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Rajit Manohar, associate dean for academic affairs at Cornell Tech, teaching a physical computing class.

The sparkling, sprawling new campus on Roosevelt Island filled with gee-whiz technology — still just ink on paper. The thousands of students and staff, the transformative effect on the city's economy, the integration with the Technion-Israel Institute of Technology — those all remain in the future, too.

But just 13 months after being awarded the prize in Mayor Michael R. Bloomberg's contest to create a new science school, Cornell NYC Tech got up and running. Eight students enrolled in January in what is being called the beta class, a one-year master's program in computer science. And Cornell has made it clear that, in many ways, this is not the usual university program.

Not long ago, three young high-tech entrepreneurs sat with the students, talking about failure. They talked about questionable technical, financial or personnel decisions in start-up businesses they had created or worked in, about companies they had seen disintegrate, and about detours into projects they later discarded.

A question was asked about Andrew Mason, co-founder of Groupon, who had been fired a day earlier as the company's chief executive.

“We should all be so lucky as to build a company that the investors care enough about to fire us,” Tim Novikoff, the C.E.O. of a small company making mobile phone software, said with a wave of his arm around the table, prompting laughter from the students and knowing nods from the Cornell Tech staff. A rail-thin man with the deep-set eyes of someone who could use a little more sleep, Mr. Novikoff is in his early 30s, making him the oldest of the three visitors.

“It’s a miracle if a start-up gets off the ground,” he said. “The last six months I’ve had no income, I have no health insurance. But I got to fly out to a C.E.O. conference and talk with Ashton Kutcher about mobile video for 10 minutes.”

The visitors urged the students to take risks but to expect, at least at first, a precarious existence, riddled with setbacks, that will require obsessiveness and a thick skin — and they made it sound like the grandest of adventures. None of them made the reference, but they could all have been citing Samuel Beckett’s maxim: “Ever tried. Ever failed. No matter. Try again. Fail again. Fail better.”

Scenes like this play out each week at Cornell Tech, part of an unorthodox curriculum designed to eschew the traditional detached, highly academic approach to learning. Instead, business, technology and real-world experience is baked into the coursework.

“There’s no parallel to that in any traditional computer science program I’m aware of,” said Dan Huttenlocher, dean of Cornell Tech. “We’re taking a page from business schools.”

The practicums are organized by Greg Pass, a Cornell alumnus who was the chief technology officer at Twitter and now is the chief entrepreneurial officer of the graduate school. They are held in an informal setting each Friday with entrepreneurs from the city’s blooming tech sector, who are often no more than a few steps ahead of where the students are.

Reinforcing the sense that the work produce practical results, the United States Commerce Department has stationed a patent officer on the premises to help with patent applications and commercial strategies — an arrangement that federal officials say is a first.

A business class is mandatory, in addition to the usual technical courses. And the students are required, in each semester, to work with mentors from the private sector to design and create new products. Two of the students, Alex Kopp and Andrew Li, are working with a Google engineer on open-source software that predicts the severity of weather events.

“In Ithaca, you take a bunch of classes and then you have your one master’s project — you work on it alone,” said Mr. Kopp, who transferred from a master’s program at Cornell’s main campus. “It typically doesn’t have a business aspect to it, or you might be working on something that a professor is doing. This has a very different feel to it.”

Information technology is the common thread through the eight degrees the school plans to offer. Three will be dual master’s degrees from Cornell and the Technion, based on three “hubs” rather than traditional departments. One hub program, “connective media,” has largely been mapped out — though professors warn that it is subject to change as technology changes — and will deal with designing the mobile, fragmented and endlessly malleable technology that makes everyone a media creator as well as consumer. The other hubs, still under development, are being called “healthier life” (systems to improve health care delivery as well as personal technology) and “built environment” (computing applied to the physical world around us, from robotic devices to smart building design to real-time traffic information).

The curriculum will not be confined to standard disciplines, but will combine fields like electrical engineering, software development and social sciences, and professors will teach across those boundaries.



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The charter class had to accept a high degree of uncertainty. Cornell has made it clear that, in many ways, this is not your typical university program.

In fact, no professor has an office, not even the dean, and Dr. Huttenlocher insists they will not when the campus moves to Roosevelt Island, either. Instead, each person has a desk with low dividers, and people can grab conference rooms as needed — much like the headquarters of a small tech company.

“We’re trying to separate personal space from private space, to create an environment with constant interaction,” he said. “Believe it or not, this is a very important piece of the culture we’re trying to create.”

Some of Cornell Tech’s approach can be seen in Deborah Estrin’s computer networking course. She invites important innovators in the field to poke holes in conventional wisdom and get the students thinking about questions that go far beyond the curriculum.

One week, Bob Evans, a project manager at Google, challenged a cliché in software development, “Good, fast or cheap — pick two,” meaning you can’t have all three. To Mr. Evans, fast and cheap — and highly adaptable — is good by definition, allowing engineers to identify needed updates, repairs and new features. Creating a polished product before it is ever put to use is pointless, he told the class, because it will always need to be changed.

“Software is one brief moment of creation and a lifetime of maintenance,” he said.

Another week, Dr. Estrin’s guest was Scott Shenker, chief scientist of the [International Computer Science Institute](#) at the University of California, Berkeley. “I’m going to ask you questions,” he said at the outset. “The most important thing to know is I don’t care about your answer. It’s to get you to think.”

In acerbic fashion, he argued that the Internet protocols that are a foundation of global communication are fundamentally flawed, hinder traffic rather than help it and require billions of dollars in networking equipment that will soon become unnecessary.

In fact, Dr. Estrin had helped develop those very protocols before taking a turn into wireless sensing systems, and then applying those systems to health care. Her nonprofit organization, [Open mHealth](#), develops open-source software that collects, combines and analyzes streams of data from devices that monitor the human body, be it one’s physical activity or blood sugar.

Cornell officials consider it a coup to have gotten Dr. Estrin, who recently finished a 10-year project at the University of California, Los Angeles, backed by the National Science Foundation.

Reading Cornell's proposal, with its hubs on connective media and healthier life, Dr. Estrin said, "I felt like I had been part of the team writing it."

THE staff and students at Cornell Tech can be seen as pioneers or guinea pigs — or both — and it was a select group who were ready to play that role (one of the original eight has already dropped out). The student body is intentionally small. They had to accept a high degree of uncertainty about what lay ahead and a very short time frame for deciding on their futures, and they had to be in the metropolitan area, or ready to move on short notice.

Classes started on Jan. 21. Some arrived in the city unsure of their schedules. Less than a month before they started, it remained unclear whether Cornell would find housing for those traveling from other parts of the country (it did).

"For me, from hearing about the program to applying was less than a month, and from that to getting to New York City was just another couple of months," said Greg Tobkin, 27. A Williams College graduate, he had set out to earn a doctorate in computational biology at Cornell but left the program after three years and moved back to his hometown, San Francisco.

"I looked at biotech jobs, but it was a bad time to be looking, if you had zero actual biotech experience," he said. After a year, "I started looking at master's programs that had really rigorous comp sci and would also give me a chance to explore industry, so it was as if the Cornell Tech program were written for me." He added: "Each week, we go visit some new start-up that is (a) awesome and (b) looking to hire."

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Ted Krum, like Mr. Tobkin, turned a career roadblock into an opportunity, but his change of direction was more profound. Mr. Krum, 47, who lives in Garden City, Long Island, had a job in finance before being downsized last year. He had studied computer science at Yale — he later got an M.B.A. at the University of Chicago — and his early work in finance involved writing software. He considered applying to Cornell Tech for a job, but his wife, an executive recruiter, suggested he apply as a student.

"We spent many evenings after our son was in bed figuring out if this was right, if we could swing it financially," he said. Tuition comes to \$43,185.

Mr. Krum's computing knowledge was out of date, and studying alongside students half his age, he would have some catching up to do: "I thought, what's the bigger risk, staying put in financial services and swimming against the tide of tens of thousands of job cuts, or going back to my first love, computers, and a field that's actually growing?"

One thing the students have in common is being excited, not intimidated, by doing something so untested. Mr. Krum called it “the hottest ticket to the hottest show in town.”

Building Cornell Tech is decidedly seat of the pants. Dr. Huttenlocher still does not have a good idea how many new students the school will enroll in September, how many professors it will have then, or what classes it will offer. Nor is anyone sure how fast the various programs will be designed by the professors and authorized by New York State. State approval for dual degrees with the Technion, which has not operated in New York before, is more complex — one reason that, at the outset, the courses are Cornell’s alone.

Though Cornell and the Technion are taking it further, the relationship between most engineering and computer science schools and the business world is already so fluid as to startle someone with a liberal arts background. Professors routinely take breaks from academia to go into business. Former students and professors create companies based on work done within university walls and reach back into them to collaborate and recruit talent. Universities often own pieces of new ventures.

This kind of cross-pollination helped create thriving tech sectors in the areas surrounding the Technion, Stanford, the University of Texas and the Massachusetts Institute of Technology — something Mayor Bloomberg wants for New York. And it is of growing importance to universities, not just for their ability to draw top faculty and students, but also for their finances. “Technology transfer,” the private-sector use of university-born innovations, has become a multibillion-dollar source of revenue for schools.

When Mayor Bloomberg asked business leaders about the city’s economic prospects, the complaint he said he heard most often was a shortage of top-notch talent in computer science and engineering. The hope was that a new graduate school could turn the tech sector into another pillar of the city’s economy, like finance, medicine and media. In 2010, the mayor announced a contest, offering city-owned land on Roosevelt Island worth hundreds of millions of dollars, and up to \$100 million worth of capital improvements.

Columbia, New York University, Carnegie Mellon and others submitted proposals, but only one, Stanford, proposed a project as big as Cornell’s. Columbia and N.Y.U. already had engineering schools in the city and plans for expansion, while Stanford had a thriving relationship with Silicon Valley.

More than any other bidder, Cornell saw the contest as a potential game changer. An Ivy League university with highly ranked programs in computer science and engineering, Cornell had a geographic disadvantage. Ithaca, small and remote, was not likely to become the heart of a new Silicon Valley.

But New York City, with a growing lineup of tech businesses and a large contingent of Cornell alumni, was a second home to the university — site of its medical school, part of its labor relations school and architecture school and other facilities. For years, Cornell has offered a bus service between the city and Ithaca, making the four-and-a-half-hour drive several times daily.

City officials said no university worked as hard as Cornell to accommodate and impress them, and in December 2011, Cornell’s joint bid with the Technion was named the winner. Columbia and N.Y.U. were also awarded grants to expand tech offerings in what Mayor Bloomberg dubs [Applied Sciences NYC](#).

Last month, plans for the 12-acre campus on Roosevelt Island won approval from the City Planning Commission and have gone to the City Council for final approval. When finished, in about 25 years, the campus is projected to have more than 2,000 students and two million square feet of space. The timetable calls for the first building to open in 2017.

David J. Skorton, Cornell's president, says that helping create one of the world's great tech environments may be the university's most important venture of the next generation. "It's a terrific opportunity to create a model institution for 21st-century higher education in the applied sciences," Dr. Skorton said, "and it boosts the visibility of the university as a whole."

He also cites the rather old-school benefit of being in the thick of things.

"Interactions can occur at a very long distance now, but you still see that many, many serendipitous steps forward are based on the old concept of bumping into people, having lunch, that personal interaction," Dr. Skorton said. "We're already seeing that in the temporary campus, in the Google space.

"Even with all our technology," he added, "proximity still really matters."

Richard Pérez-Peña covers national higher education for The Times.