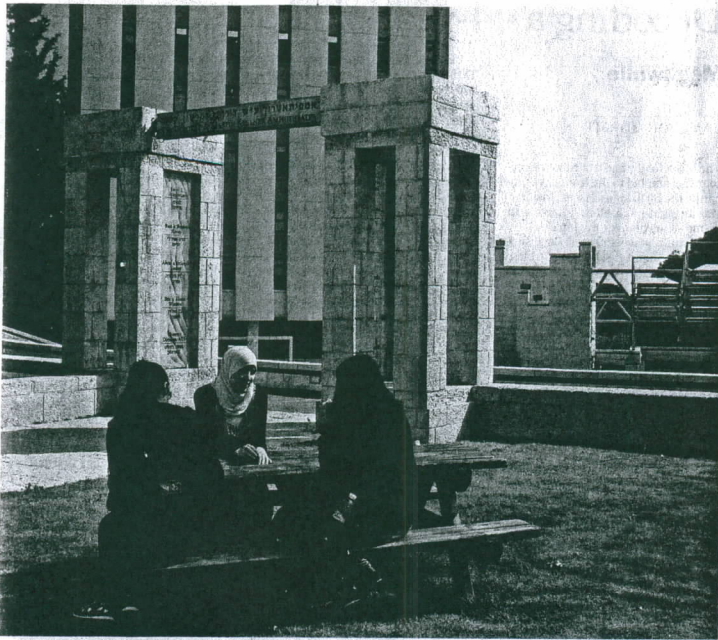


# Education



Arab students, left, who represent 20 percent of the Technion student body. Students at the biorobotics and biomechanics labs, top right; and students receiving instructions on safety procedures at the university's "clean lab."



PHOTOGRAPHS BY RINA CASTELNUOVO FOR THE NEW YORK TIMES

## BRIEFLY Education

### East Asian powerhouses top new regional ranking

Times Higher Education has published its first university ranking focusing on Asia. While it includes the Middle East, South Asia and Turkey, its standout performers were all East Asian economic powerhouses.

On the top-100 ranking released last week, Japan had the most institutions (22), followed by Taiwan (17), mainland China (15) and South Korea (14).

The top 10 individual schools were: the University of Tokyo, National University of Singapore, University of Hong Kong, Peking University, Pohang University of Science and Technology in South Korea, Tsinghua University in Beijing, Kyoto University, Seoul National University, Hong Kong University of Science and Technology and the Korea Advanced Institute of Science and Technology.

The report cited "challenges facing India," a nation of 1.2 billion with only three schools, all of them technology institutes, in the Asian top 100 and none in the top 10.

"Rapid growth in the face of staff shortages and declining per-student spending has affected standards," Pawan Agarwal, an Indian government education adviser, wrote in the T.H.E. supplement. JOYCE LAU

### Foreign students to return to London Metropolitan

London Metropolitan University, which lost its right to admit students from outside the European Union last autumn over allegations of visa problems, announced last week that it would be able to resume accepting foreign students.

The move by the Home Office to strip it of its "trusted sponsor" status meant that thousands of students had faced deportation. It also cost the university, which serves some of London's poorest neighborhoods, nearly £20 million, or about \$30 million, in lost income.

"That translates directly into educational opportunities and resources for staffing," the university's vice chancellor, Malcolm Gillies, told *The Financial Times*.

Although university officials welcomed the decision, the university said it would continue to pursue legal action against both the Home Office and the U.K. Border Agency. A High Court judge ruled in September that current

## The school behind Israel's tech evolution

HAIFA, ISRAEL

Since it opened in 1923, Technion has been a generator of innovation

BY DANNA HARMAN

When the Technion class of 1957 graduated, its members got together and wrote a letter of complaint to Prime Minister David Ben-Gurion, who was otherwise busy building a nation.

"There were no jobs for us in our fields," recalled Gideon F. Inbar, an elec-

reach."

One recent weekday evening during the exam period, Mr. Malsby was at the game center in the student union, where young men and women were slouching on couches behind Falcon flight simulators or facing off in FIFA 13 soccer matches on a wall of monitors — each one with a knapsack still strapped firmly onto both shoulders.

"It's a pressure cooker here, and doing O.K. requires a lot of effort," Mr. Malsby said. "This university consumes you, and you don't get a break if you have a job, or even if you start your own company." He added with a grin, "You still have to pass advanced inter-

1905, in part as a response to the exclusion of Jews from engineering studies in Europe, Technion finally opened in 1923, when there were no Hebrew words for most of the technical terms needed to teach a basic engineering class. Since then, the university has come up with more than just translations for "aerodynamic" and "nuclear."

"I can say without exaggeration that Israel could not have been built without the Technion," said Yossi Vardi, who has founded or helped build more than 60 companies in Israel and has five degrees from Technion. "There is a Technion graduate behind practically every

been the most popular on campus.

The curriculum at the Technion-Cornell Innovation Institute will be similarly multidisciplinary. The institute is a major component of the new Cornell Tech campus that is scheduled to open in 2017 on Roosevelt Island in New York. The program has been rolled out in temporary headquarters in Chelsea, a Manhattan neighborhood.

Craig Gotsman, a Technion computer science professor with two start-ups under his belt, will direct the institute, which will eventually account for a third of the academic activity on the Cornell Tech campus. Next year, the institute will

are older and more focused. Israel is also a country of newcomers, he added, hungry for success, willing to take risks and good at adapting to new situations.

Alon Wolf, who directs the biorobotics and biomechanics lab at Technion, had another theory. "People say it's the army, or the stressful, uncertain life in Israel that makes youngsters resilient and pushes them to think out of the box and find a way ahead," said Dr. Wolf.

"But I'm telling you, it's the Jewish mother. I look at my wife" — an industrial engineer at Technion — "she is on the kids' case day and night. 'Did you do your homework? Good. Now, what was it

BY DIANNA HAKMAN

When the Technion class of 1957 graduated, its members got together and wrote a letter of complaint to Prime Minister David Ben-Gurion, who was otherwise busy building a nation.

"There were no jobs for us in our fields," recalled Gideon F. Inbar, an electrical engineer who is now 79. "My wife kept saying, 'Oy, things are grim, grim, grim.'"

In 2013, the student body had pretty much the opposite problem.

"Officially, the rule is that first- and second-year students should not take outside jobs," said Peretz Lavie, president of the Technion-Israel Institute of Technology, Cornell University's partner in creating an ambitious graduate school for applied science and engineering in New York City. Mr. Lavie, a psychophysicist who periodically ducks out of his roomy hilltop office to check in on his sleep-disorder laboratories and two start-up companies, acknowledged that exceptions were made. Often, because getting out and ahead in the work force is, in many ways, the very idea.

"They turn a blind eye," noted Asaad Malshy, 24, who is studying physics and electrical engineering while working two afternoons a week at Intel, one of Israel's largest employers. "I used to dream that I would finish university and get a job in high tech," he added, "until I realized the dream was already in

firmly onto both shoulders.

"It's a pressure cooker here, and doing O.K. requires a lot of effort," Mr. Malshy said. "This university consumes you, and you don't get a break if you have a job, or even if you start your own company." He added with a grin, "You still have to pass advanced integral algebra."

But if Technion has refused to coddle its charges — about 9,000 undergraduates and 3,800 graduate students — I.B.M., Intel, Microsoft, Yahoo and the like will make up for it. All have set up offices along a direct bus route from the student housing, recruit heavily from the student body and offer working hours that take those advanced integral algebra exams into account.

Much as Silicon Valley popped up around Stanford University, and Route 128 near Boston has come to symbolize high technology because of its proximity to the Massachusetts Institute of Technology, so Technion has transformed the sleepy northern city of Haifa into a buzzing high-technology center.

In a country known as start-up nation, Technion is not the only university where students can bury themselves in robotics, engineering and computer science labs, but it is generally considered the best. When M.I.T. is mentioned in a movie showing in Israel — "American Pie," for example — the Hebrew subtitle simply says "Technion."

Conceived by the Zionist Congress in

"I can say without exaggeration that Israel could not have been built without the Technion," said Yossi Vardi, who has founded or helped build more than 60 companies in Israel and has five degrees from Technion. "There is a Technion graduate behind practically every highway, desalination plant, new missile technology and start-up company in the country."

**"Israel could not have been built without the Technion."**

That is not mere school spirit talking. According to Shlomo Maital, senior research fellow at the Samuel Neaman Institute for Advanced Studies in Science and Technology, a part of Technion, a quarter of the university's 60,000 alumni who are of working age have initiated a business at one time or another, and a quarter are chief executives or vice presidents.

Among inventions from Technion research labs: the memory stick, drip irrigation, the Parkinson's drug rasagiline and the Iron Dome air defense system.

"Just how does the Technion do it?" Mr. Lavie asked rhetorically.

A key to the Haifa curriculum has been learning by doing. Interdisciplinary courses that combine business and innovation — like Technological Entrepreneurship, taught by Dan Shechtman, a Nobel laureate in chemistry — have

neighborhood.

Craig Gotsman, a Technion computer science professor with two start-ups under his belt, will direct the institute, which will eventually account for a third of the academic activity on the Cornell Tech campus. Next year, the institute will begin recruiting students who are interested in "connective media," one of three focal hubs. (The others are "healthier life" and "built environment.")

The hope is to build an ecosystem like the one at Haifa, where industry and academics feed off each other.

Mr. Vardi, a Technion board member and one of Israel's most high-profile entrepreneurs, put it more simply: "What the Technion is really bringing is its genes. It's like bringing in genes from outside the family." When tasked with explaining where the innovative fervor comes from, Israelis often refer to DNA — a belief that there is something genetic in the determination of its students.

"Teaching entrepreneurship is extremely difficult," said Saul Singer, co-author of "Start-Up Nation: The Story of Israel's Economic Miracle." "But it is clear that to succeed in it, your students have to understand something about being on a mission. You have to know what it is to be part of something larger than yourself." Immigrants and soldiers, he said, understand. Military experience, mandated in Israel, instills leadership, teamwork, improvisation, obedience and sacrifice and means that students

and pushes them to think out of the box and find a way ahead," said Dr. Wolf.

"But I'm telling you, it's the Jewish mother. I look at my wife" — an industrial engineer at Technion — "she is on the kids' case day and night. 'Did you do your homework? Good. Now, what was it about? Why did they give you that homework? And what about your extracurricular activities? Tell me about that.'"

Others talked of chutzpah, the same cultural trait of audacity and arrogance that propelled the class of 1957 to write to the prime minister to complain about not finding good jobs, and that continues to propel so many current graduates as they charge into industry.

Mr. Malshy does not buy into the chutzpah culture. He did not have a Jewish mother, did not serve in the army and is not an immigrant. Like 20 percent of the Technion student body, he is Arab. Asked what created the bubbling innovation on campus, he said that it was the teaching. No DNA involved. "They take students who are already talented and at the top of the class," he said, "and then hammer excellence into them, and not just excellence, but the expectation of innovative thinking. That's what happens to us."

**ONLINE: A REAL LOW-COST STUDENT BUDGET**  
Ken Ilgunas writes about how he afforded graduate school — by living in a van. Read his story and others' in the Education Life supplement. [nytimes.com/edlife](http://nytimes.com/edlife)

Times.

Although university officials welcomed the decision, the university said it would continue to pursue legal action against both the Home Office and the U.K. Border Agency. A High Court judge ruled in September that current students should be allowed to stay in Britain to complete their studies. He also granted the university the right to seek a judicial review of the government's action. D. D. GUTTENPLAN

**German universities to get €4.4 billion more funding**

Germany is injecting an additional €4.4 billion worth of funding into the country's universities, the German media reported Friday.

The extra funds, worth more than \$5.7 billion, are to come in equal parts from the federal and the Länder, or state, governments. They will be used to help institutions deal with a boom in student enrollment. The government estimates that between 2011 and 2015, 630,000 students will enroll in German universities, 360,000 more than predicted. Chancellor Angela Merkel and heads of the Länder are expected to approve the funding boost in June.

The jump is due partly to higher birthrates and the discontinuation of mandatory military service, according to Der Spiegel. CHRISTOPHER F. SCHUETZ

## New York City vies to be high-tech hub with Cornell satellite campus

NEW YORK

**Graduate program uses lessons from start-ups in science coursework**

BY RICHARD PÉREZ-PEÑA

If all the hopes and hype are warranted, a nondescript third-floor loft in the Chelsea neighborhood offers a glimpse of the future, for New York City and for Cornell University, whose main campus is located hours away from the metropolis by car. In truth, it does not 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.

The sparkling, sprawling new campus on Roosevelt Island, in New York City's East River, is to be filled with gee-whiz technology — but it is still just ink on paper for now. 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 — whose

main campus is in Ithaca, about 175 miles, or 280 kilometers, from the city — 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 and 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 are 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 the playwright 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 practitioners 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 New York 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 U.S. Commerce Department has stationed a patent officer on the premises to help with patent applications and commercial strategies — an arrangement that U.S. officials say is a first.

A business class is mandatory, in addition to the usual technical courses. And the students are required, in each



Andrew Li, left, a student, developing weather software with a Google engineer.

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 to New York City from a master's program at Cornell's main campus in upstate New York. "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. The curriculum will combine fields like electrical engineering, software development and social sciences, and professors will teach across those boundaries.

No professor has an office at the school, 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 at 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."

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 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 Jan. 21. Some students got to town 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 United States. (It did.)

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. 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 open windows of new ventures.

This 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 Mr. Bloomberg wants for New York City. And it is of growing importance to universities, not just for drawing top faculty and students, but for their finances.

When the campus is finished, in about 25 years, it is projected to have more than 2,000 students and two million square feet, or 186,000 square meters, of space. The timetable calls for the first building to open in 2017.