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Features

They call it the billionaire factory: welcome to Silicon Valley's feeder school; At Stanford University, students have start-ups, the professors are Google investors and Mark Zuckerberg pops in to give lectures. By Rhys Blakely

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The laughter is manic and cacophonous - the kind you might find in a lunatic asylum.

Forty of the brightest university students in America are chortling and guffawing, clutching their sides, bending over double. The hilarity is the result of a warm-up exercise designed to ready them for a class in "creativity and innovation". The game goes like this: a student must tell a joke they have made up on the spot. The joke must follow the following formula: "One hundred and eighty-five [insert something] walk into a bar. The barman says, 'We don't serve [blanks] here.' The [blanks] say [insert improvised punch line here]."

Of course, the resulting gags are lousy. But that's the point. The idea is to accustom the students to "throwing things out into the world, not caring about whether they work", explains one of the teachers. No matter what, the audience must laugh uproariously. It is enough to make somebody like me (British, mildly introvert, slightly neurotic) deeply ill at ease. But, again, that's the point.

Amid the din, Dr Tina Seelig, the creativity guru leading the session, bounds over. "It's not Oxford, is it?" she says. I take a break from forcing a chortle (I was kindly invited to join in). I think back to my education - the tutorials where our English professor would pour us sherry before discussing *The Waste Land*.

No, I agree, it is not.

Welcome, then, to **Stanford University** in California - Silicon Valley's feeder school and the world's leading producer of zen billionaires and buccaneering tech visionaries. John Doerr, a legendary local venture capitalist, once called the Valley the site of "the greatest legal creation of wealth in the history of the planet". This tiny nook of the Golden State, just south of San Francisco, produced the first commercial microprocessor, the personal computer, the web as we know it, the iPad - and the dot-com crash. It's home to Apple, Google and Facebook. And without Stanford, none of it would have been possible.

One staff member I speak to calls the university "the farm". The reference is to the system in professional baseball, where minorleague clubs supply major teams with a constant stream of potential new players. At Stanford, people learn how to play the Valley's game, from innovation to negotiation, in an environment where it is possible to eat and breathe entrepreneurship as at no other seat of learning. Tech start-ups are a dime a dozen - as are 19-year-olds with business cards that read "co-founder". It is a place of untrammelled optimism. "These students don't want to work for Google or Facebook," confides one professor. "They think those companies are done; they're too big, too bureaucratic."

These days, especially, the air is electric with opportunity. The market for nascent tech companies is booming. Between classes, students in flip-flops and shorts dissect the latest deals at Stanford's Coupa Café outlets.

Even the weather is on-message: the climate is Mediterranean and the vibe is one of almost freakish fecundity. One visiting journalist recently described Stanford's grounds as "so startlingly paradisaical, so fragrant and sunny,

it's as if you could eat from the trees and live happily for ever". The immaculately maintained buildings are named after the tech billionaires who funded them - men like Bill Gates and Yahoo's Jerry Yang. The paths that link the campus's handsome sandstone quads teem with cyclists, who zoom to lectures past palm trees and Rodin sculptures.

Inside the classrooms, meanwhile, the worlds of academia and business co-exist in unique proximity. I sit in on a finance lecture - a lawyer from Facebook looks on from the sidelines before swooping in to give (free) advice to students on how a start-up should allocate shares to a new worker. "Mark Zuckerberg turned up to our computer science seminar one day and just gave a lecture - out of the blue," says George Burgess, a 20-year-old British first-year student who turned down a place at Cambridge to study at Stanford. "That's pretty cool. And it's perfectly normal here."

Even the architecture is supposed to facilitate serendipitous meetings of possible collaborators by drawing pedestrians to key buildings. Recently the university hired its first "entrepreneurship concierge", Angela Hayward, a Brit with a background in venture capital whose job is to match students with a dizzying array of resources, from trustworthy mentors and potential investors, to the half-dozen student clubs that focus on start-up creation. "Students can spin their wheels for a while looking around or they can speak to somebody who knows the scene," she says. "I point them to people who have the right motives."

George Burgess is a rather good example of the type of student Stanford attracts - apart from being British, that is (Indian and Chinese accents are far more common). He went to the independent St Paul's School in London and at 15 years old was the "managing director" of his own eBay shop, turning over more than £36,000 a year. By the age of 18, he had founded EducationApps, a start-up publisher that produces educational content for mobile phones, and counts the BBC, Pearson and Oxford University Press as partners. When he applied to Cambridge, his teachers told him not to mention his business, in case he "scared off the dons". In his Stanford application, his main selling point was his entrepreneurial record. This term he's getting academic credit for running his company.

Burgess may complain about the legal drinking age - 21 in the US - and is lukewarm about the frat parties that dominate the social scene ("Sticky floors, pounding music... Not my thing," he smiles). But for what he wants to achieve, the Stanford milieu is incomparable. Here, even the world's most secretive computer scientists will find time to talk to an undergraduate. Burgess describes how a classmate recently found himself sitting next to two Apple engineers - employees of America's most furtive company - in a bar. "They were talking about maps, and he's really interested in mapping, and he turns to them and they talk for the next three hours."

Burgess - just 8 years old when the first dotcom bubble burst - has met Stanford on the crest of a wave. The US economy may still look peaky, but the technology sector is on a roll. In the first four months of this year, 57 stock market flotations were priced on Wall Street, the most since the equivalent period in 2000, and 21 were tech companies. As techcrunch.com, a website that is required reading among Stanford's undergraduates, puts it, "It's official: we're back in boom times."

On campus, there's no avoiding the hot topic of conversation: Instagram, a photo-sharing network started by two former Stanford students in their late twenties, Kevin Systrom and Mike Krieger. It has 13 employees and has existed for 18 months. Its first investor was a Stanford alumnus. It is yet to turn a profit and has no discernible revenue model. And it has just been bought by Facebook for \$1 billion (£617 million).

A century and a half ago, this region was in the grip of the Gold Rush. Today, if you suggest that Stanford is helping to stoke an analogous frenzy in the tech sector, you risk the wrath of its professors. Tina Seelig taught the Instagram founders and remembers them as humble, unremarkable Stanford students - which is to say, they were really quite remarkable indeed. "My guess is Kevin and Mike wanted to build something really cool that people wanted to use - I do not believe their primary motivation was to sell the company for \$1 billion," Seelig says. She also believes that creativity can be taught, and that entrepreneurial skills are essential, whether you're a businessman, brain surgeon or housewife. Later, she grows a little animated when I ask about the wealth Stanford creates. "This is a very thoughtful and responsible community. The major initiatives of this university are related to international peace and security; improving human health; repairing the environment. We are certainly not focused primarily on making money."

On campus, though, signs of Stanford's riches abound. I meet Jenna Nicholas, 22, another British student, inside the engineering school, in an atrium where Google's first server sits on display. The server was assembled at Stanford, where Sergey Brin and Larry Page were graduate students. It is held together by Lego bricks and sticky tape, and it gave birth to a business now worth \$200 billion (Stanford made more than \$300 million from selling the Google shares it secured in those early days).

Nicholas possesses an almost uncanny level of maturity. Clearly, she could excel in, say, the City, but believes anything less than a start-up would be selling out. She acknowledges that the gathering market hype has permeated the campus - and that some of her peers are bent on making piles of cash. "It's fired up the sense of what's possible," she says of the Instagram deal. But her start-up, Phoenix Global Impact, is a social enterprise that hopes to kindle philanthropy in China and she's in the process of registering another nonprofit company. When she says making money isn't a big factor in her thinking, I believe her.

Meanwhile, as the new tech bubble inflates, so does the sense that Stanford has become America's academic lodestar. The number of students applying to the university has soared in the past four years (only about 6.5 per cent will get in). In each of the past seven years, Stanford has raised more money than any other American university, and the foreign accents you hear in class suggest its influence will be felt worldwide for decades to come. Indeed, Stanford's enthusiasm is infectious, and when you spend time in Silicon Valley these days, the impression grows that this place has usurped New York and its financiers to become the new capital of the American Dream.

After all, the high priests of Silicon Valley are now venerated across the planet. The death of Steve Jobs, who co-founded the world's most valuable company in a garage just a few miles from Tina Seelig's classroom, elicited the kind of grief usually reserved for a religious leader, and Vanity Fair - a magazine more closely associated with movie stars - has anointed Mark Zuckerberg the most influential man on the planet. Even American Vogue Editor-in-chief Anna Wintour has decreed that computer coders "can be chic". In short, the geeks have inherited the Earth - which brings a new urgency to the question, what does their alma mater stand for?

Academically speaking, Stanford's big idea is "interdisciplinary education". This means that students studying diverse subjects - engineering, business, medicine, design - are encouraged to congregate to solve problems together. Engineering students are pushed to dabble in humanities and vice versa. The goal is to produce "T-shaped students" - individuals with a deep specialism, but who are familiar with several fields.

The idea appears to have worked for at least two graduates: Instagram founders Systrom and Krieger. In 2005 and 2007, respectively, they entered the Mayfield Fellows programme, an elite interdisciplinary regime designed to foster "extreme leadership" skills. Just 12 students are chosen each year from a variety of departments. For nine months they are immersed in business theory and coached in creative thinking and practical skills, such as how to network. And then, this being Stanford, they are seconded to a Silicon Valley start-up.

Offered the chance to join this year's Mayfield cohort at a workshop on negotiation, I tell myself to pay special attention. This, after all, is where the Instagram guys learnt how to haggle. And they managed to extract \$1 billion from Facebook for a company with no profits. Instagram CEO Kevin Systrom made \$400 million out of the sale. The word on campus is that his opening gambit involved demanding \$2 billion from Mark Zuckerberg.

The atmosphere is relaxed, but when a handful of Mayfield students arrive a minute late, Tina Seelig orders them to perform a dance. The penalty seems to backfire when the stragglers begin bustin' moves in their sterile, minimalist white classroom. Later, when they split up into pairs for a role-playing exercise, most of the fellows slope off outside to sit in the sunshine. When they regroup, Seelig leads a discussion. Everything that is said is gently encouraging. The main thrust of the session, it seems, is that it pays to be a reasonable negotiator: in the Valley, you never know when you'll have to deal with somebody again in the future. The most intriguing insight? Studies have shown that interviewees tend to do well when an interviewer does most of the talking.

In the three days I spend on campus, I meet precisely one man wearing a tie: Professor William F. Miller, the unofficial guardian of the Stanford legacy. Now 86, he was the last faculty member to be recruited by Frederick Terman, the legendary engineering dean who is often called "the father of Silicon Valley".

When I ask Miller to explain what makes Stanford special, he suggests I think back to 1885, when the institution was founded. Just nine years before, Custer had made his last stand; California had been a state for less than three decades. "This was the Wild West... We were still fighting wars with the Native Americans," he says. "The people who came here - the faculty and so forth at Stanford - were what you could call pioneers. And pioneers have two qualities. One, they have to be adventurous. But two, they're also community builders." This idea - that the co-operation between brilliant, pioneering minds has fuelled Stanford's success - is one of two pillars on which the campus credo rests. The other, Miller says, involves failure. "If this place has a secret sauce, it is that it's OK to fail. The great sin is not to try."

Silicon Valley may thrive on change, but those two principles have endured. Today they are espoused by power brokers such as Chi-Hua Chien, a partner at Kleiner Perkins Caufield & Byers, one of the region's most prominent venture capital firms. Rich, humble and generous with his time, Chi-Hua is a model Stanford man - and another Mayfield Fellow.

While a business school student in 2006 (he has four Stanford degrees altogether), he wrote Facebook's first business plan. Then he introduced Mark Zuckerberg to Accel Partners, the social network's biggest outside investor. When Facebook goes public - expected next week - that introduction is likely to result in a profit of \$10 billion to \$12 billion for Accel, the biggest ever by a venture fund.

These days, Chi-Hua works on Sand Hill Road, the epicentre of tech investment in the US. His firm's office is a ten-minute drive from Stanford and resembles an aching hip ski lodge. Outside, the sunlight is dappled by a grove of mature trees; hollyhocks grow chesthigh. The aura is of extreme but muted wealth: the flashiest car parked outside is an Audi A5. "In Silicon Valley, culture, honour and prestige are based on what you create and how important it becomes. Not on how much money you make from it," Chi-Hua tells me. (As we stroll to his office, we pass a counter top littered by half-a-dozen open bottles of Veuve Clicquot, most of them empty.)

Chi-Hua is one of those people who generate a sense of motion even when they sit still. He leaps out of his seat to pull books from shelves to illustrate his argument, pointing out the notes he made in the margins while an undergraduate. He gained his first degree, in industrial engineering, in 1999 at the height of the first dot-com boom. He describes how he "walked into an atmosphere at Stanford that was just electric with start-up opportunities". By the time he was a second-year student, he had a group of friends who would gather every few weeks "to meet to just talk about start-up ideas".

Like William Miller, he believes that Stanford and Silicon Valley are both defined by a culture of collaboration. "Start-ups share info all the time - that's how they get smarter," he says. It happens, he believes, because it happens. "It's like asking, 'Why do people in LA care about what car they drive?' Because other people in LA talk about what cars they drive. Or why do people in New York talk about money so much? Because other people in finance in New York love money so much."

But he also hints at the Valley's less celebrated side - its utter lack of nostalgia and its curious slant on loyalty. In the Valley, you succeed by obliterating your predecessors: think how Amazon killed the independent bookstore and Facebook destroyed MySpace. For Chi-Hua, this is the behaviour of "the ultimate Darwinian market. If your product and company are better, you will win." He argues that the Valley "makes economic systems ruthlessly efficient through software... It sees most industries as old, calcified and broken, with lots of fat on them."

Stanford can seem to revel in - even fetishise - this process; its professors applaud such acts of "creative destruction". "Do we still want to be driving around with horses and buggies?" asks Tina Seelig. "Progress is exciting."

Right now, however, not everybody is happy with the university's progress. On the day I arrive, the campus is buzzing over an article in The New Yorker, which questions whether the university is too close to business - and whether the pursuit of profit is distracting from the pursuit of knowledge. The piece decries a "gold-rush mentality" where "corporate and government funding may warp research priorities". One Valley venture capitalist shrugs it off, telling me that the East Coast-based magazine is jealous of the West Coast's success. But a Stanford professor, who asks not to be named, tells me that the charges have touched a nerve.

Many in the humanities departments are alarmed at the emphasis on engineering and commerce, she says. Some 25 per cent of Stanford's undergraduates and more than half of its graduate students are engineering majors; at Harvard, the equivalent figures are 4 and 10 per cent. Meanwhile, the Stanford President John Hennessy is a director of Google and of Cisco Systems, two behemoths whose fortunes could be radically altered by a start-up that produces a killer piece of disruptive technology.

Another scathing critique has come from Peter Thiel, the contrarian tech investor who made a fortune out of PayPal and was the first outsider to back Facebook. Thiel studied at Stanford and occasionally teaches there, but his venture capital firm, Founders Fund, has published an arch online manifesto with the subtitle, "We wanted flying cars, instead we got 140 characters". He believes the tech boom has delivered plenty of dinky gadgets but no solution to America's jobs crisis; no silver bullet for climate change; no answer to global poverty; no cure for cancer. His conclusion? "You have dizzying change where there's no progress."

Stanford's more candid academics concede that such complaints bear scrutiny. "There are three ways of telling the story: at its best, it's a beautiful tale of reinvention and industry co-operation," says Robert Sutton, professor of management science and engineering at the Stanford engineering school. "On the other extreme, you could say it's all about greed and the ability to get ahead. Or you can make a more balanced argument in the middle."

Instagram is not typical - most start-ups fail. Indeed, Sutton suggests that venture capitalists should supply health warnings along with their cash: "For the \$10 million we'll give you, please note that you will continue to work 60 hours a week for 3 to 5 years, that there's a 90 per cent chance you will receive no financial return beyond the

salary you're paid and, moreover, if you are financially successful, there's a 50-50 chance you will be fired from your own creation."

The message may be scary, but it doesn't seem to faze Stanford's buccaneering students. After all, nobody said that inventing the future was going to be easy.

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