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The Insider

JOSH WOLFE, EDITOR

This month we bring you interviews with three remarkable entrepreneurs who each aim to change their respective industries for the better. As we delve into the depths of eye drugs, data science and student debt, we reveal new technologies for age-related diseases, novel approaches to modern-day dilemmas, and a radical rethinking of post-college conundrums.

We start with Guillaume Pfefer, who left the world of

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Start-Up Eyes Big Opportunity In Drug Delivery

Dr. Guillaume Pfefer joined Kala in July 2012 as the company's president and CEO and a member of the board of directors (*Full disclosure: my venture firm is an equity investor in Kala*). Dr. Pfefer brings to Kala more than 15 years of experience in the pharmaceutical industry leading commercial, strategic, and industrial operations and R&D. Prior to joining Kala, Dr. Pfefer held a number of ascending leadership positions over a nine-year career at Sanofi. He most recently served as general manager of Sanofi Pasteur Mexico, one of the company's largest worldwide affiliates. His previous positions include vice president and global head of the Sanofi Pasteur's Influenza and Pneumococcal Franchise and global head of Corporate Strategy. Prior to his tenure



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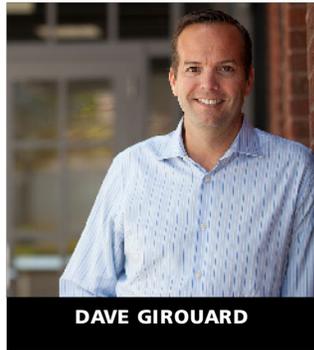


ANTHONY GOLDBLOOM

Anthony Goldbloom is the founder and CEO of Kaggle, the world's largest community of data scientists, where individuals compete to solve complex data science problems, and top competitors get invited to consult on projects from some of the world's biggest companies. Before founding Kaggle, Anthony worked in the

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DAVE GIROUARD

Dave Girouard is co-founder and CEO of Upstart, a crowdfunding platform that lets recent college grads raise capital in exchange for a small share of their future income. Previously, Dave was president of Google [GOOG] Enterprise. He built Google's cloud apps business worldwide, including product development, sales, market-

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with Sanofi Pasteur, Dr. Pfefer held executive management positions with Aventis and Rhone-Poulenc. Dr. Pfefer holds a Master's degree in Chemical Engineering from the National School for Chemical Engineering (Nancy, France), a Ph.D. in Materials Science from Centre National de la Recherche Scien-

tifique (CNRS), France, and an MBA from the Wharton School at the University of Pennsylvania.

How did you get involved in the world of drug development?

I started 19 years ago with Rhone-Poulenc in product development. One of my very first projects was designing micro-particle formulations of steroids for asthma treatment.

What did you learn about how drugs go from idea to product?

One thing never to forget is that drug development is a costly, long and risky journey. Nothing comes easily. There are lots of variables involved throughout the drug development process. The process can take many years, but that's also an exciting adventure. Before you start getting serious about development, you are swimming in pure science and you go through a phase of idea generation, which is exhilarating for any scientist or organization.

But once you have screened these ideas and have made the decision to move into development, it becomes a challenging process as you have to carefully manage timelines and resource mobilization issues. So part of the charm of pure discovery is gone, and you're putting your product candidates through a very demanding exercise. What are required then are knowledge, expertise and structure. That's where large pharmaceutical organizations add value in bringing new products to the market.

What made you decide it was time to join a startup?

My goal has always been to make an impact on the lives of patients. That has always come first. Like a lot of people, I try to find purpose in my life. My kids and family have definitely given me purpose, but professionally speaking, I wanted to have a meaningful impact. The best place for that was a start-up company in the health care industry because you have a direct opportunity to make a difference for people through innovative treatments that can literally change their lives. Being part of a large organization is one thing, but when you take responsibility to lead a company, your potential impact is even greater. And if you are successful, you really move the needle.

When you learned about Kala, what about the company caused you to believe it had the chance to make a big impact?

The science behind Kala is just unbelievable. I think it would be hard to find a company with a better scientific grounding. Secondly, the financial backers are exceptional, bringing great energy, expertise and alignment with the idea that we can leverage science to make a tremendous difference in the world. Making an impact is only going to be possible with the right team. We have a tremendous concentration of brain-power at Kala. The co-founders Bob Langer from MIT, Justin Hanes from Johns Hopkins University and serial entrepreneur Colin Gardner are at the top of their game. Hongming Chen and her team are the best and the brightest, with a strong ethic, striving for excellence while doing the right thing for patients. We recently added Kim Brazzell, one of the best experts in the ophthalmology field as our chief medical officer and are about to announce the addition of two world-class talents to Kala.

What is Kala's unique proposition?

The technology is something that no one has ever seen before. It's been developed over 10 years of research exploring the mucosal barrier, which not only serves as protection for organs, but also as a major barrier for the efficient delivery of drugs. What has been discovered is a very smart and elegant way to tremendously improve the delivery of drugs to organs or tissues that are protected by mucosal barriers. When using this technology, it's as if these barriers do not even exist.

How will this breakthrough translate into commercial products?

The ability to deliver drugs through mucosal barriers is absolutely critical to address diseases afflicting the vaginal tract, GI tract, respiratory tract and the eye, so this technology has extremely broad applications and great potential across a wide array of severe diseases. In the respiratory area, for example, Kala technology could be used to create new treatments for cystic fibrosis, asthma or COPD. Since our products can bypass the mucosal defense mechanism, our drugs can go straight into tissue in a much more efficient way—better than any delivery system

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Big Pharma to join a tiny company with a tremendous opportunity to change the treatment of ophthalmic diseases. Kala Pharmaceuticals (*Full Disclosure: my venture firm Lux Capital is an equity investor*) makes particles that pass through the eye's natural barrier to deliver drugs that last longer and reach previously inaccessible regions. Guillaume shares his vision for fighting blindness, replacing invasive injections with once-daily drops.

Next up is Anthony Goldbloom, whose winning essay entry led to the creation of a fast-growing venture. Anthony's company Kaggle has attracted the world's best and brightest data scientists and put them up for hire to solve complex challenges faced by data-rich corporations. We uncover the three requisite traits to create winning predictive models, and learn why you should consider color when purchasing your next used car.

Finally, we sit with Dave Girouard, an ex-Googler who seeks to unlock human capital through the power of crowdfunding. By allowing "upstarts" to "borrow from their future selves," Dave's company enables young innovators to follow the career paths of their choosing, un beholden to debilitating debt and other hindrances to the entrepreneurial spirit. When "backers" take financial interests in individuals, it raises some controversial questions.

As always here's to thinking big about thinking small...and to the emerging inventors and investors who seek to profit from the unexpected and the unseen.



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we've seen to date.

In ophthalmology, which is where Kala is focused today, we have the opportunity to address loss of vision and diseases affecting the retina in a transformative way.

Why did the company choose to focus on ophthalmology?

That's where we currently have the clearest pathway to making a dramatic impact in patients' lives. In the ophthalmology market, there are several unmet needs that we believe we can uniquely address. The nature of the ophthalmology space also gives us the ability to develop our future products in a very capital efficient and rapid way. Our lead program, a best in-class anti-inflammatory product based on a marketed B&L molecule, loteprednol etabonate, could be developed and launched in the growing post-cataract surgery market in just a few years.

What are the initial disease targets Kala hopes to address?

We have two lead programs. Our first is an anti-inflammatory drug in the post-cataract surgery market, which is a \$500 million market in the U.S. alone. Our products promise to deliver superior dosing, efficacy and safety. Down the road we have the option to create a lot of additional value for that product, both geographically outside of the U.S., and with expanded indications such as allergy and dry eye and even back-of-the-eye treatments as well. All in all, we believe we can build a billion dollar franchise.

The second program is both exciting and ambitious. The goal is an unprecedented, noninvasive, topical treatment for wet age-related macular degeneration (AMD). We have the opportunity to create a transformative treatment for wet AMD, which is one of the leading causes of blindness in the world.

The last piece of our primary focus is the drug delivery platform itself. Here we have engaged with many of the major players in the pharmaceutical industry to marry our technology with industry drug candidates.

What about the eye has made it a difficult place to deliver drugs?

The eye has been difficult with respect to delivery of drugs in part because of the barrier posed by the tear mucin, which traps exogenous material, and the subsequent rapid

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clearance mechanism that replaces the tear film every 10 seconds as you blink. As of today, all treatment for retina diseases involve invasive means such as direct intraocular injections or implants, so there is a significant need for better ways of treating these diseases. We have also heard from experts in the field that a number of ocular surface and anterior chamber therapies could greatly benefit from innovation in the manner by which drugs are being delivered.

What is AMD and what part of the eye does it afflict?

AMD is a degeneration of the macular region of the retina that can lead to significant impairment or loss of vision. It generally affects older individuals and can lead to partial or total blindness. Patients start with dry AMD, which is associated with gradual vision loss. Approximately 10% of dry AMD cases will convert into wet AMD, which is a more severe form of disease that can rapidly lead to significant vision loss and blindness. There are currently no treatments for dry AMD so patients can only be monitored and supported. Once a patient develops wet AMD, the only available treatments require a direct injection into the eye, in some cases every month for the rest of their life. Not receiving the treatment can result in rapid loss of vision and is often irreversible. We have yet to discover a way to treat this disease noninvasively.

What has Kala shown in this area?

We just shared some amazing data at the Association for Research in Vision and Ophthalmology (ARVO) conference two weeks ago. In animal testing, we demonstrated that we can deliver extremely high levels of compounds known to treat angiogenesis (the cause of wet AMD) to the back of the eye with something as simple as a topically administered eye drop, which gives us great

confidence to push this program forward and go after the development of a drug that will treat wet AMD noninvasively in humans.

How big of a market opportunity is that?

Wet AMD is actually growing with the aging of the population. The market today is close to \$4 billion worldwide. And in places like Russia and China, wet AMD is the main cause of blindness, yet no treatments are available in those two countries. So we have an unbelievable opportunity to touch many lives and bring transformative treatments to them; the first company able to bring a non-invasive treatment for wet AMD to the market will grab a lion share of that large opportunity.

How have existing companies reacted to some of the data you shared?

We have been talking to a number of existing pharmaceutical and biotech companies. They've all been intrigued as we were bringing the first application of nanotechnology to their field. Now they are engaging with us either to explore the possibility to work with us on our lead programs or to benefit by leveraging our drug delivery platform to deliver drugs in their own pipelines.

What can we expect to see from Kala in the next few years?

As early as next year, we will have our first human data from a potentially pivotal Phase 2/Phase 3 clinical trial, and I am confident the results will be positive. After that, we're going to be one short study away from having a product that we can submit for NDA approval for the anti-inflammatory post-cataract surgery market. Next year, we're also going to be generating a demonstration in humans that we can transport drugs into the retina from a topical eye drop administration. That would be an amazing set of data that, if

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positive, I think will potentially revolutionize the way we treat ophthalmic disease. 2013 and 2014 should be amazing years for Kala.

Will the company remain solely focused on ophthalmology?

While we have chosen ophthalmology as a first application for our technology, we've also received a grant from the Cystic Fibrosis Foundation (CFF). There are many opportunities beyond ophthalmology for this technology, and we are trying to find capital efficient ways to continue to nurture these possibilities and to add applications to the platform. For example, in addition to cystic fibrosis, one of our founders is currently exploring mucosal vaccination as a potential future application for the technology. In a small company with a broad technology platform like ours, strategic thinking involving focus and flexibility is particularly critical.

As you look back on your experience in the pharma industry and how technology is changing the industry, what trends are you paying attention to today?

We have definitely entered a new era of drug development—the biological era—that I believe will bring a new wave of dramatic innovation to the industry. In the past, most of our treatments were based on small molecule chemistry based drugs. That pipeline of new molecules has diminished. But now we're seeing new insights into biology serving as a scientific foundation for a whole era of new products that promise to do amazing things for global health.

What advice would you give to other aspiring biotech entrepreneurs?

It takes commitment. You've got to put your passion, patience, talents and everything you've got into the game. And as a leader, and even more so as a leader in a small organization, you owe it to your people and your investors to provide a clear vision of where you want to bring your company. Leading is defining direction, and that is something that nobody but you can really do. It is also supporting your team as the company marches toward the objective set forth. Biotech is like the America's Cup. Best technology, best strategy, best tactical choices: you win! **ET**

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macroeconomic modeling areas of the Reserve Bank of Australia and before that the Australian Treasury. He holds a first class honours degree in economics and econometrics from the University of Melbourne and has published in *The Economist* magazine and the *Australian Economic Review*. In 2011, *Forbes* magazine cited Anthony as one of the 30 under 30 in technology and *Fast Company* featured him as one of the innovative thinkers who are changing the future of business.

How did you first hatch the idea for Kaggle?

My background is econometrics, and around 2007 I was doing forecasting for the Australian Treasury in Canberra. Everyone used to read *The Economist* magazine. One day, I noticed the magazine was advertising for an essay competition. I entered and ended up winning the prize, which was a three-month internship at *The Economist*. For two and a half months, I wrote about the global financial crisis (GFC). During my last few weeks, after getting a bit sick of the GFC, I wanted to write about something I was personally interested in, and pitched a piece to my editor on predictive modeling and data mining (as it was then called). I got the go-ahead, and got to call people up and say, "Hi, it's Anthony Goldbloom from *The Economist*, and I'd like to interview you..." Everybody answered my calls. I learned how people were doing predictive modeling, what was stopping them from making more of the opportunity and so forth. It was a fantastic way to do market research. But what was frustrating was realizing that although I thought I could personally assist with some of the problems these people were trying to solve, I knew that if I had contacted them in another context, I would never have gotten the time of day. So the initial impetus for Kaggle was this idea to create more of a meritocracy for data scientists, so that people could demonstrate their real ability.

How did your idea evolve into an actual company?

After the internship, I got back to Australia and was really restless. *The Economist* was kind of mind opening, and this idea was just running around in the back of my head. I ended up quitting my job up and moving to

the Reserve Bank in Sydney in early 2009. I found it suffocating to work there, so I started teaching myself to code and worked on this business idea as a side project. It wasn't until August of that year that I finally got the guts up to leave my job and give it a go.

What was the biggest challenge in getting the company off the ground?

It's funny you ask that. I think at every point in this business I've been unrealistic about how hard things were going to be. If I knew at the outset how hard things were going to be and how unlikely I was to be able to succeed, I think it would have been totally irrational for me to pursue this idea. There were challenges at every step of the business that were incredibly difficult. At first, when I couldn't really code properly, I used to think that once I coded up the Web site, this thing was obviously going to be a success. Of course, it turns out that putting up a Web site was probably the easiest bit. Then it was like, "Wait a minute, how on earth do I find people to compete in these challenges?" How do you get a marketplace started? I had neither data scientists who wanted to compete in competitions, nor did I have customers wanting to put out problems.

When did you realize you had actually hit on a valuable concept?

The second competition we did was a complex a genomics problem, taking genetic markers and predicting the progression of HIV viral load. An academic came to us with a data set commonly used to study this problem. We put it up on Kaggle, and in three months we were able to improve the accuracy of prediction, reducing the error rate by about 13% versus four years' worth of published research on this topic. That got us written up in *Science* magazine and it was the first instinct I had that wow, there was actually something pretty special here.

For complex challenges like that, does a data scientist need domain expertise to come up with a good solution?

Domain expertise actually tends to play a really pretty *de minimis* role in how well somebody does on a problem. A domain expert has to be able to ask the right questions. But once the right question has been asked, that's where the domain experts' usefulness pretty

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“It’s not the huge problems, but rather the seemingly mundane problems I want this platform used for. I want every single analyst in every single company making decisions on the basis of data, rather than intuition.”

much goes away, and you really want somebody who is super proficient at handling data. In the early days of selling Kaggle, I used to make the pitch that the best solution to a problem might come from an unusual place, so therefore it made sense to throw it open to a huge audience. One of the really surprising things we found is it turns out the same people kept winning competition after competition. There is clear skill that is transferrable from one problem to another.

So what are the traits of a great data scientist?

A combination of things. First of all, you’ve got to be creative. Second, you need to be a good programmer. And last, you need to be tenacious. Creativity is important for coming up with ideas to test. To give you an example, we did a competition for a used car dealer that wanted to predict whether cars were going to be reliable or not because they’re on the hook for warranty claims. What the winner found was that car color had a huge influence on reliability—more so than make or model or anything else. It was surprising, but the reasoning was if someone purchased an unusually colored car, they probably took good care of it, because they bought it as a statement of sorts. In order to come up with ideas like that to test, you’ve got to be pretty creative, and that’s one of the characteristics of a great data scientist.

Now, the person who found that connection between car color and reliability probably tested about a thousand different hypotheses. To do something like that, you’ve got to be able to code well and use good programming practices and version control to iterate over lots of ideas in a short period of time. The more ideas you can iterate over, the more likely you are to find something that works. Finally, people who are tenacious are the ones who see something odd in the data

and instead of moving on, they keep chasing it down until they know exactly why it is the way it is, because it’s often those little oddities that lead towards making a big breakthrough.

As computational tools become increasingly powerful and sophisticated, will the role of people in solving some of these problems become less important?

I’ve got a bit of a nuanced answer to that question. When analyzing data sets, it’s possible to find correlations that are coincidental, and also correlations that are genuinely meaningful and possibly causal connections. As data sets get larger, the less likely it is to find coincidental correlations. However, we often find problematic things in a dataset, what we often call a leakage. For example, we were going to run a competition for the cancer council of Victoria, taking a whole set of survey variables to predict who had prostate cancer and who didn’t. We found we could predict with 99% accuracy who had prostate cancer, and who didn’t. The most predictive survey response? “Had prostate cancer surgery.” That’s not an interesting insight. But this problem is really common—one of the variables was leaking the answer. That was an obvious case, but there are many subtle cases as well, and the only way you can detect whether or not you have leakage is you have to have some sense for what your algorithm is actually doing—it can’t be a black box. That said, in the hands of skilled data scientist, no algorithm, no matter how complex or how obfuscated it seems, should be a black box. Even if you’re using something crazy complex, you should be able to back out what the important features are if you know what you’re doing.

What is one of the more surprising solutions to come out of a Kaggle

competition?

The result I’m probably most proud of and also most surprised by involves a competition we did for Hewlett Foundation. They collected 22,000 essays from around America, each of them graded by two teachers, and wanted an algorithm that matched the average grade of the two teachers to grade papers automatically. When they first came to us, we told them this was a silly project and probably wasn’t possible. We were totally wrong. The winning algorithm was about as reliable as the teachers. That said, you could probably game an algorithm by stuffing in big words or using other techniques, but the result was pretty breathtaking and one that I was particularly proud of.

How does Kaggle generate revenue as a business, and how do you see the company growing over time?

We have two lines of business. One is competitions. For real commercial problems, we charge on the order of \$200,000 to \$500,000 per algorithm. That’s historically where the majority of our revenues came from, and got us some of our first large customers. But internally, our main reason for focusing on competitions is to qualify and rank data scientists. And that relates to our latest product, called Kaggle Connect, which I’m really excited about and I think where the future of our business lies.

Kaggle Connect is one-on-one matching. We launched it earlier this year, and it has already become a major source of revenue. This product is basically the result of the surprising insight that the same data scientists keep winning again and again. Our community of 94,000 data scientists are ranked from 1 to 94,000. We take the top 0.5% of these people and put them into a pool called the Kaggle Connect pool. And so now a company will come to us and purchase a block of hours, and they can spend that block with any of the top data scientists in our pool. We sell the product in two ways. First, through an enterprise channel, where we already have great relationships with companies like GE [GE] and Merck [MRK] and others we’ve done work for. And the second way we’re selling is through a self-service channel. So let’s say you’re a marketing analyst, and you’ve got a problem and want to be able to access a data scientist to get a rigorous answer. Rather than

Mining Data

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having to go through procurement and IT and that entire headache, you can literally just swipe your credit card and purchase hours through Kaggle Connect.

How do the results from an individual data scientist compare to a competition?

The results won't be quite as strong. With competitions, somebody makes an entry, then others work to get ahead of that person, and they keep leapfrogging each other until they've all landed on about the same score, which we call the limit of what's possible given the noise and richness of the dataset. Now, that's extremely powerful in a very narrow circumstance, which is when you have an extremely high value, well specified problem that you want to squeeze every bit of juice out of. But the vast majority of data science problems are not that well specified, and a 90% solution is often good enough. A competition might cost you \$200,000 to \$500,000. For \$12,000 - \$30,000 (depending on how big the algorithm is), you can get a solution that's 90% as good as that.

If there was one problem you could solve through the Kaggle, what would that be?

It's not the huge problems, but rather the seemingly mundane problems I want this platform used for. I want every single analyst in every single company making decisions on the basis of data, rather than intuition. But if there was one big problem I'd go after, I think I'd love to have a crack at weather forecasting, because I'm a mad keen kite surfer, and while the weather forecasts aren't bad, I'd like to see if we could do any better.

Where did the name Kaggle come from?

The name was algorithmically generated. I didn't want to spend \$10,000 buying a domain name, so I wrote an algorithm that iterated over phonetic domain names and printed out a list of those available. My wife and I sat down and crossed off all the ones we didn't like, and then sent our short list around to family and friends. Kaggle came out on top. In some ways it's an unfortunate name though, because a lot of Americans pronounce it "kegel," like the pelvic floor exercises. Anyway, it's a good icebreaker. **ET**

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ing and customer support.

When was the shining moment you decided it was time to start a new company?

The idea for Upstart got planted in my head about a year and a half ago, and it came from some conversations I had with people who were exiting college and trying to figure out what they wanted to do next. A Kauffman Foundation statistic says 54% of millennials want to run their own company. I consistently heard the story where grads had something that they'd be excited about, what I call "Plan A," that tended to be risky, unknown and entrepreneurial. But instead, they were choosing a "Plan B," which was to take a safe job that would enable them to pay back their student loans.

It struck me as unfortunate that these grads were passing up on what they really wanted to do because of the pragmatic necessity of paying back student loans. It's also not necessarily a great thing for the economy overall, because we need more people creating jobs and taking risks. One of the interesting facts I discovered as I was thinking about Upstart is that companies larger than 500 employees are roughly creating zero net new jobs. This struck me as both a big problem in process as well as an opportunity. If you could allow people at this age to borrow from their future selves, from their future income, it could have a huge effect, because \$30,000 when you're in your 30s or 40s might not be nearly as meaningful as it would be when you're 24 or 25 and are getting started.

If you take a step back and look at how students get through college today, and the ultimate career trajectories they take, what does that process look like and how do you hope to rethink it?

There was a time a few hundred years ago where the road to success as an adult was that you became an apprentice in some area. You worked as an understudy to somebody and learned the ropes and worked your tail off.

And at some point, as soon as you could, you hung out your own shingle and you became a blacksmith, or whatever your tradecraft was. The industrial age shoved us all into cubicles and into production lines, and that notion disappeared. All of a sudden, the trajectory became to go to college, get that reliable job, work your way up the career path and the American dream could be yours. That's now crumbling, because of the amount of student debt people are coming out of school with and also because of the changing nature of the economy. We are in a place where more of us are going to have to be entrepreneurs. And this is the sort of world where we think Upstart makes sense.

So for someone that's interested in pursuing a more entrepreneurial path, how do they get involved with Upstart?

Today, you have to be a U.S. citizen and have to have graduated or will graduate from a college or a graduate school between 2008 and 2014. You have to create a profile about yourself and fill out an application, and assuming you're eligible, you publish yourself onto the platform, and people decide if they want to back you. They can back you for a few hundred dollars or a few thousand dollars. What you're sharing with your backers in exchange for their investment is a small fraction of your personal income over 10 years. So, you're taking money from your future, and you're bringing it to the present. We don't decide ourselves who gets funded, that's really a marketplace decision.

How do you go keep tabs on payments to upstarts and future payouts to backers?

We manage the entire process of collecting the repayments and distributing to backers. After you receive funding, within a short period of time, you go into repayment. You repay Upstart monthly based on your actual earnings. It's self-reported and then it's reconciled once a year through your U.S. tax returns. There's a "trust but verify" aspect to our system where

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we do keep in touch, we do collect monthly, and then we credit to your backers' accounts. They don't have to do anything, they just see a repayment come back to them every month, or hopefully multiple repayments from different people that they've backed.

How long has the Upstart platform been up and running?

The platform opened in November, so it's been about six months.

When you bring on a student or a recent graduate today, what are some of the key criteria you look for in vetting them for the platform?

Ultimately we do a lot of vetting in terms of making sure they are who they say they are. We do identity checks and credit checks. We don't expect them to have stellar credit track records, but we do want to make sure they're not already in a really bad situation credit-wise. We verify their academic standings, and we get their transcripts. But generally, once you pass this filter, our goal is not to decide who's worthy of funding or not. We view that as something for the backers on the platform to decide.

What are some of the unexpected challenges you've run into in launching such a different funding mechanism?

When people hear about Upstart and the notion of investing in a person, some people respond, "Oh my gosh, what does that mean, do they own the person? Is it indentured servitude?" I almost smile inside when I hear that, because we know it's controversial and we know it's different, but we also know how useful and important and disruptive it is. So I kind of like being on the edge of controversy. We have to continue to get the brand out there and help borrowers understand why income-based repayment is actually better than fixed rate loans. On the investor side, we are dealing with two different things happening, one of which is we're creating a financial investment that stands entirely on its own in terms of risk, volatility and return, because you're investing in the wages and earnings of people which, relative to a lot of other things, are very low volatility, very stable and predictable. But on the other side, investors are also doing something that's meaningful and has a mission to it. You're helping somebody get where

they want to go. That sounds wonderful but sometimes you get caught in the middle. It's not a donation, but it is mission driven; it is something where you can put your money behind doing something really good.

It's a fascinating concept. In other markets, it's been interesting to watch how online communities and distributed pools of wealth are disrupting lending industries that haven't changed much over time.

One of the things we just released is a calculator (www.upstart.com/calculator). It's open to the public, and you can type in your school, your degree and your graduation year, and it will show you a 10-year projected income curve. So whether you graduated five years ago and you want to see how you're doing versus your peers, or you're considering what college to go to, it's a really interesting way to take an honest look at your decisions. If you're going to pay a lot of money to go to school, you ought to understand the other side of the economics, the earning potential of that degree from that school. We think this is actually the first time this has ever been put in one place where you can actually go get a sense of what a degree is worth. I think transparency is really critical to people making better decisions here.

What's been some of the most critical feedback you've received, and how have you responded?

Generally, we hear feedback that it's not easy enough to get on the platform. A simple example that we heard very loud and clear is if you were a recent grad and applying for Upstart, you wouldn't actually know your funding rate, or how much money you could raise for what percent of your income, until the very last step. You'd have to go through the whole process to get there. It's easy to understand how that's almost the first question somebody would want to know, not the last one!

So that's one of the reasons we got this calculator out there. It's not a perfect number, but it gives you a quick sense of how much you could raise without it being entirely precise, because you haven't gone through the process yet. On the backer side, some investors want to be able to fund immediately. They don't want to wait for people to set up bank accounts, etc., so we have PayPal funding now.

They want to see the projected income. How much would these people have to earn in order for them to see a positive return on their investment? And we're working to make more of that transparent, so you can actually run the numbers and do your own estimates.

A technical question: in a typical corporate structure, debt is always senior to equity. If a student with outstanding debt was unable to meet their obligations, would they need to pay back their loans before backers got paid?

Student loans have this very unique feature, if you want to call it that, that they're not dischargeable in bankruptcy. We don't have that feature. We're not officially a student loan, in the sense that your Upstart obligations are dischargeable in bankruptcy. Obviously, our goal really is to have people and the support network in place so that they don't get themselves into that situation.

How do you think the concept of crowdfunding is changing the world more broadly, and what are some areas where we're just starting to see crowdfunding have an impact?

If you think about crowdfunding in the general sense, the most obvious thing people point at is the venture capital industry, but I think there's not a lot of consternation about crowdfunding in the conference rooms of Sand Hill Road. There would be a lot of giggles if you suggested that crowdfunding is going to disrupt the VC industry. But having said that, when capital starts to flow and it's using data and science instead of just human intuition, that's disruptive to something, and if capital is available, it's necessarily going to lower the returns of other sources of capital that it's replacing.

My own belief is the more choices the better—more ways to access capital on fair and reasonable terms is a universal good for us. But it certainly comes at the cost of somebody, and that might be the credit card companies because all of a sudden people are going to Lending Club getting better deals and retiring their credit card debt. Or it could be because of people taking Upstart loans and retiring their student loans. **ET**

The Emerging Tech Portfolio

Company[symbol]	Coverage Initiated	Current Price	52-week range	Mkt Cap (\$mil)
INTELLECTUAL PROPERTY INCUMBENTS Leading researchers in the physical sciences, with big potential for spin-offs and revolutionary breakthroughs				
GE [GE]	8/07	\$23.53	\$18.02-\$24.13	\$243,300.00
Hewlett-Packard [HPQ]	3/02	24.21	11.35-24.95	46,850.00
IBM [IBM]	3/02	205.72	181.85-215.90	228,100.00
LIFE SCIENCES Companies that are working at the cutting edge of medical technology				
Life Technologies [LIFE]	11/05	74.04	39.73-74.33	12,740.00
Nanosphere [NSPH]	11/07	4.26	1.63-4.39	237.71
ELECTRONICS Companies that have corralled the key intellectual property that will be the foundation for next generation electronics				
Nanosys [private]	3/02	n/a	n/a	n/a
ENERGY Companies that are developing high-efficiency, low-cost alternative energy technologies				
First Solar [FSLR]	8/07	51.55	11.43-59.00	4,530.00
ENABLING TECHNOLOGIES Tools and instrumentation that enable critical science and technology discoveries				
Veeco [VECO]	3/02	39.47	26.15-41.00	1,520.00
FEI Company [FEIC]	1/03	71.08	42.18-73.46	2,740.00
Accelrys [ACCL]	3/02	8.55	7.50-9.98	477.47
INVESTMENT VEHICLES Funds that have investments in promising emerging technology companies				
Harris & Harris Group [TINY]	5/02	3.23	3.05-4.25	100.50
PowerShares Lux Nanotech Portfolio [PXN]	8/07	6.95	5.41-7.00	18.65
PowerShares WilderHill Clean Energy [PBW]	8/07	5.50	3.46-5.87	139.46

Word on the Street

Stock prices as of May 24, 2013

GE: A 7.2% rise propelled shares to a new 52-week high. GE is considering spinning off parts of GE Capital through an IPO as part of a plan to reduce the size of the business. GE said its financial subsidiary would pay \$6.5B in dividends to its parent in 2013. GE planned to reduce GE Capital's ending net investment (ENI), a balance sheet measure, to \$300-\$350B by the end of 2014 (versus \$419B at the end of 2012).

HPQ: Hewlett-Packard made up lost ground as the stock soared 23.6% following stronger than expected Q2 2013 earnings. HP posted an \$0.87 per share profit on \$27.58B in revenue. Wall Street had expected EPS of \$0.81 on revenue of \$28.03B. Cash flow increased 44% to \$3.6B as the company continued to pay down debt. HP now forecasts Q3 diluted EPS of \$0.84-\$0.87 and FY 2013 EPS of \$3.50-\$3.60 (above its February guidance of \$3.40). Jefferies increased its rating to Hold from Underperform, and raised its price target from \$18.50 to \$24. Sanford Bernstein reiterated its Outperform rating and \$29 price target, saying that the "risk-reward around HPQ remains favorable for patient investors."

IBM: Big Blue advanced 6% after CFO Mark Loughridge told investors that Q2 earnings will increase 8% from a year earlier, in line with analysts' \$3.79 EPS estimate. Loughridge said the company's growth in the second half of 2013 would be stronger, with "double-digit performance" in Q4. Warren Buffett also provided support, telling his investors at Berkshire Hathaway's annual meeting that he would not sell shares of IBM, despite last month's earnings miss. "I won't be a seller of IBM," Buffett told CNBC, adding that he may buy more IBM shares "from time to time."

LIFE: Life Technologies hit an all-time high during the month as the company prepares to be absorbed by Thermo Fisher Scientific [TMO]. Life announced a definitive merger agreement under which Thermo Fisher will acquire the company for \$76 in cash per share (approximately \$13.6B). The transaction, which is expected to close early in 2014, is subject to a Life shareholder vote and satisfying customary closing conditions, including regulatory approvals. Life stock currently trades less than \$2 below the final transaction value.

NSPH: Nanosphere rocketed 50.5% to a new 52-week high after investors cheered record quarterly results, newly raised capital and an international distribution deal. Q1 2013 revenues were \$2.4M, an 82% increase over Q1 2012, and the company reaffirmed guidance for \$13-\$15M in total 2013 revenue. The Q1 net loss was \$8.5M, compared with \$8.1M in the prior year period. Nanosphere secured \$27M of new capital: \$22M from a term loan agreement with Oxford Finance LLC and Silicon Valley Bank, and a \$5M stock sale to the William Blair Small Cap Growth Fund. The pro forma cash as of March 31, 2013 (including the first tranche of the loan agreement

and the stock sale stock) is now \$40.8M. Nanosphere also announced a deal with Hitachi High-Technologies Corp. to serve as the company's exclusive distributor for Japan's high growth molecular diagnostics market. The two companies also intend to collaborate on assay and platform development.

FSLR: First Solar jumped nearly 16% to a fresh 52-week peak. Lux Research projects that the solar PV supply glut could be over by 2015 with the market reaching stability after years of plummeting prices. The market research firm also projects solar industry revenue will grow to \$155B in 2018, up from \$93B in 2012.

VECO: Shares rose 3.5% to a new 52-week high as investors price in sunnier skies ahead for the LED equipment industry.

FEIC: FEI gained nearly 11% to eclipse its previous all-time high after the company set new Q1 records for bookings, revenue and EPS and operating cash flow. FEI reported all-time high quarterly bookings (\$230.7M) and posted \$221.2M in revenue and GAAP EPS of \$0.65. Analysts had forecast FEI would earn \$0.63 per share on \$220.9M in revenue. FEI's total cash and equivalents at the end of the quarter was \$441.6M, an increase of \$24.6M from Q4. The company issued Q2 guidance for at least \$230M in bookings, revenue of \$222-\$231M, and GAAP EPS of \$0.62-\$0.71.

ACCL: Shares hit a new 52-week high before taking a black eye on a poor quarterly report, and losing 12.8% on the month. Accelrys reported Q1 revenue of \$43.9M and \$0.06 in EPS, both below Wall Street's expectations of \$45.1M in revenue and \$0.08 in EPS. Full year guidance of \$176-\$181M in revenue and \$0.32-\$0.34 in EPS was also weaker than expected, short of analysts' forecasts for \$186.7M in revenue and \$0.37 in EPS. Accelrys was downgraded to Neutral from Buy at investment banks B. Riley and Sidoti & Company.

TINY: Harris & Harris Group lost 4.4% on the month. Portfolio company D-Wave Systems that its new 512-qubit quantum computer will be installed at the new Quantum Artificial Intelligence Lab, a collaboration among NASA, Google [GOOG] and the Universities Space Research Association (USRA). The goal is to use quantum computing to advance machine learning to help solve some of the most challenging computer science problems.

PXN: The PowerShares Lux Nanotech portfolio hit new 52-week high following a 3.6% gain.

PBW: The PowerShares WilderHill Clean Energy portfolio surged 18% to hit a new 52-week high.

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