LIFE SCIENCES SNAPSHOT

A Quarterly Report on Financing Trends

RECORD-BREAKING MARKETS AND A CANDID CONVERSATION ON UNIVERSITY SPINOUTS
Q2 2021

orrick

Data provided by

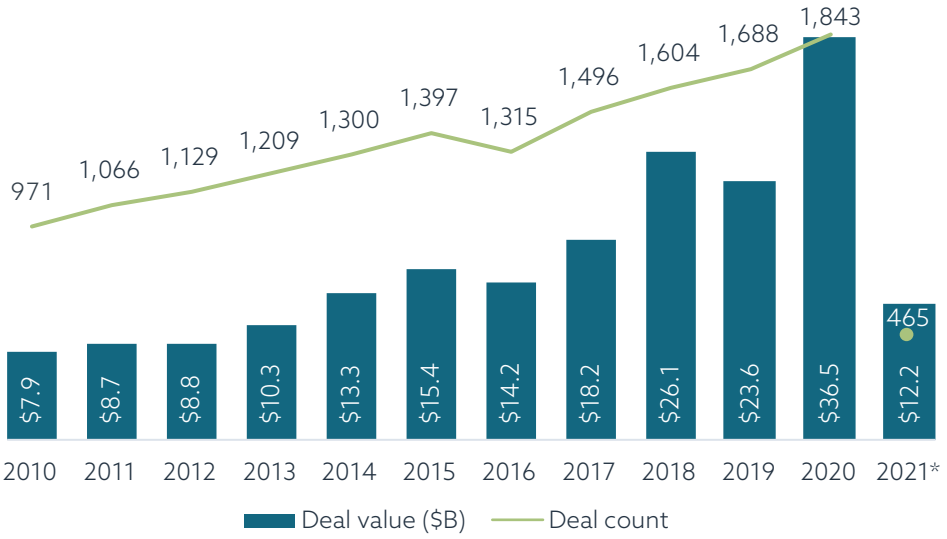
PitchBook

Key Takeaways

This edition of Orrick's series of life sciences publications breaks down the record venture investment into US-based life sciences companies in 2020 and strong showing in Q1 2021. Key findings include:

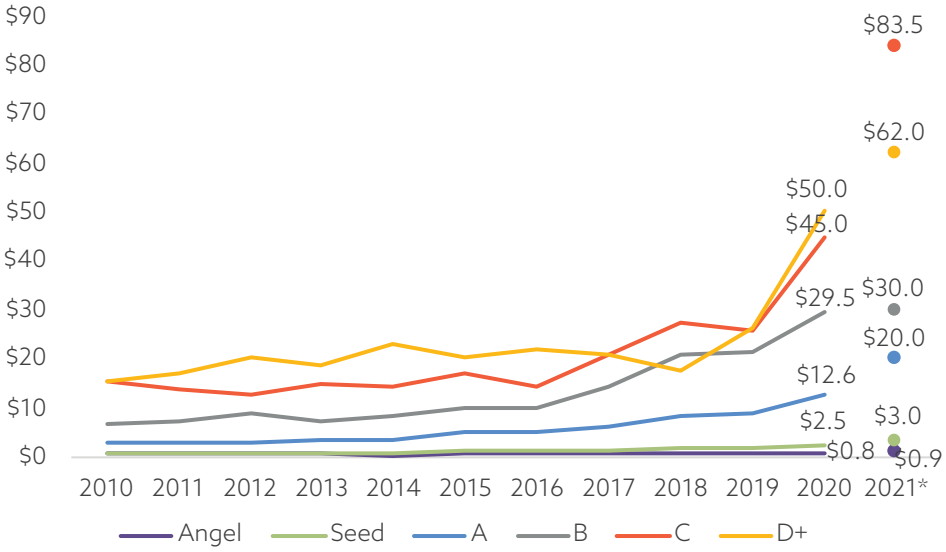
- US-based life sciences companies closed 465 venture deals in Q1 2021 for a quarterly record value of $12.2 billion.
- Along with sector interest stemming from the COVID-19 pandemic, the promise of personalized medicine seems more feasible, given increasingly powerful diagnostic platforms and the explosion in home-based point-of-care virtual health and testing kits for general health concerns.
- Investors are plowing into the sector with such fervor that deal sizes and valuations are all marking new highs, even given significant growth in the past few years.
- Liquidity remains strong, with the sector securing $17.4 billion across 51 exits in Q1 2021; SPACs have also begun to yield a handful of financing transactions for life sciences companies.
- Investment levels will likely remain strong, as macro and micro indicators remain promising.

Life sciences VC deal activity



Source: PitchBook | Geography: US
*As of March 31, 2021

Median life sciences VC deal size ($M) by series



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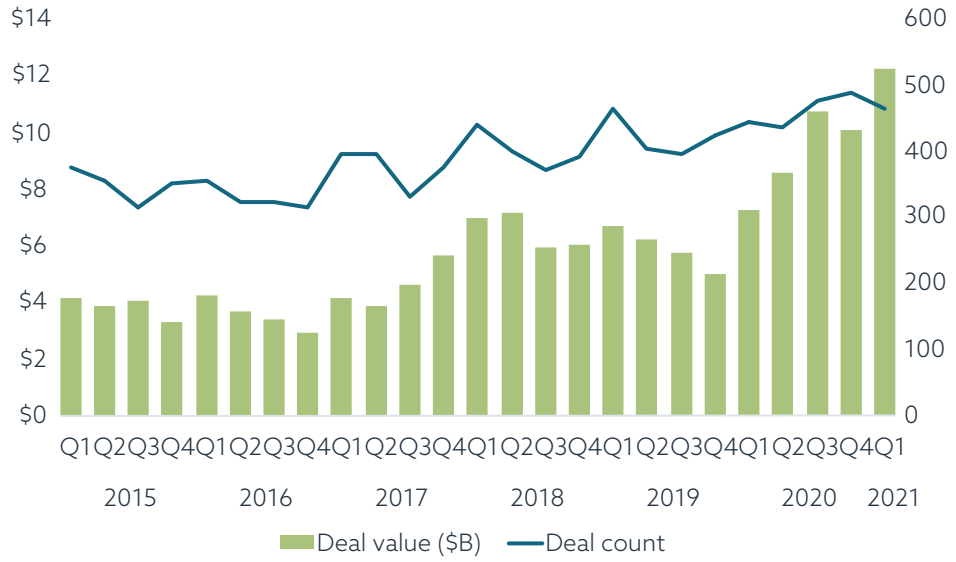
Market Analysis

Even after a mammoth $36.5 billion invested across life sciences in 2020, the first quarter of 2021 generated an even stronger start. US-based life sciences companies raised $12.2 billion across 465 deals, sustaining an uptick in deal count and marking the group's highest quarterly total deal value in at least the past decade.

Multiple factors have driven investor interest. Headlines have dubbed the 2020s as the decade of biotechnology, positing that after years of gradual technical advances following the completion of genome mapping and CRISPR invention (among other techniques and tool utilization), truly personalized medicine is finally feasible.

Whether or not that outcome is fully achievable, the broader macro factors that have encouraged the ramp-up in life sciences investment over the past decade are even more evident heading into 2021. Beyond the ongoing COVID-19 pandemic, the aging demographics of most developed nations and patent expirations have continued to prompt further investment into novel therapeutics, especially for cancer. Some of the largest VC deals of Q1 2021 were with drug discovery platforms targeting cancer by leveraging immunotherapy or precision medicine. Beyond oncology, other financings on the larger side suggest investors are also clearly concentrating on funding companies with more broadly applicable drug discovery and development platforms, including efficacy improvement and vaccine development.

Life sciences VC deal activity by quarter



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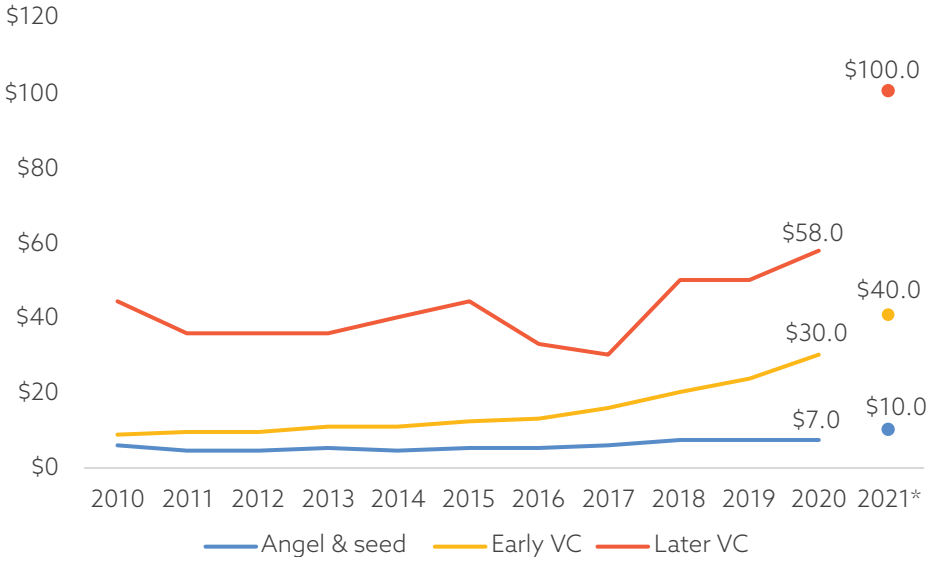
Median life sciences pre-money valuations ($M) by stage



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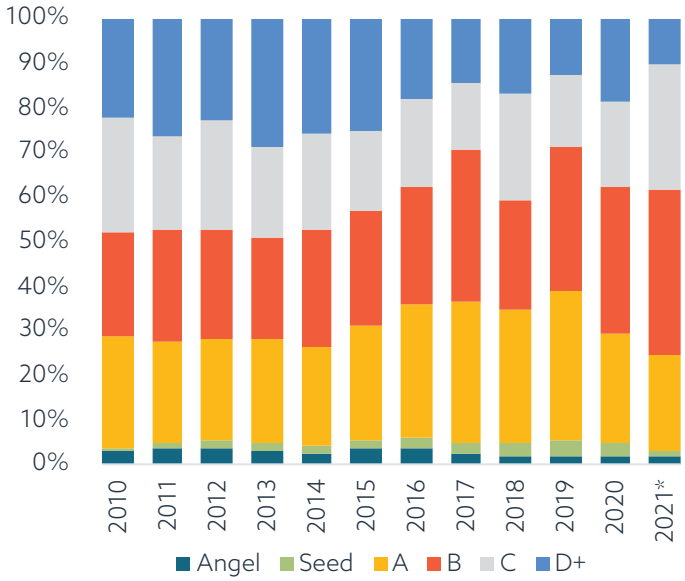
Life sciences VC deals ($) by series



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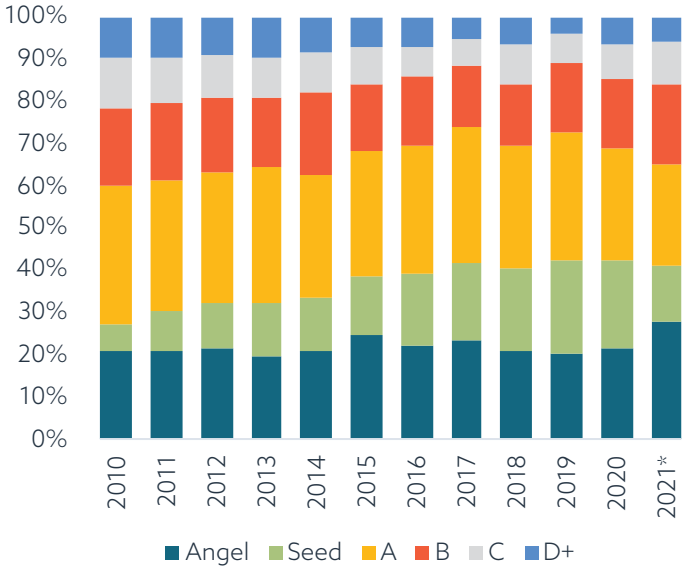
Life sciences VC deals (#) by series



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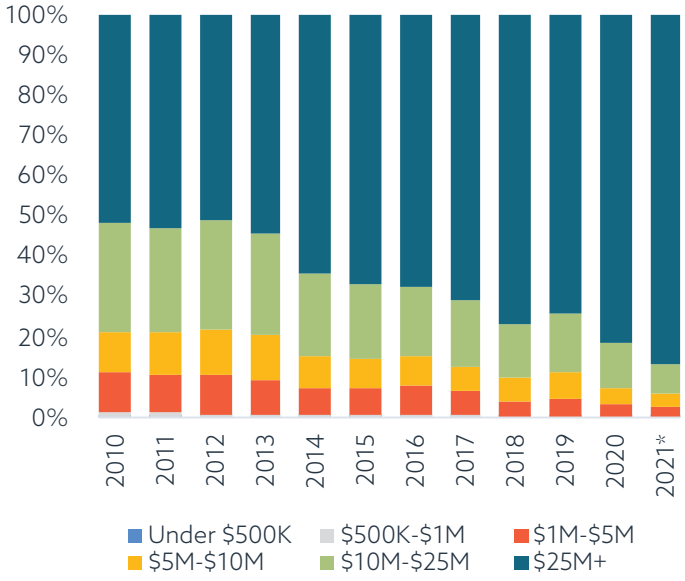
Life sciences VC deals ($) by size



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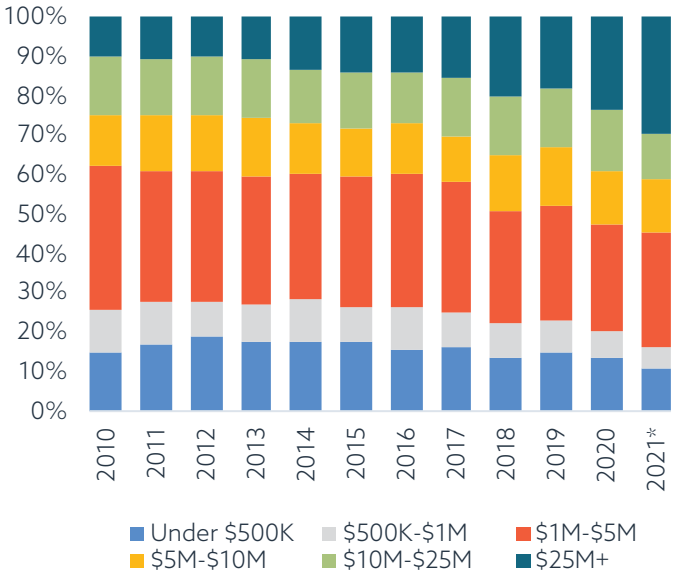
Life sciences VC deals (#) by size



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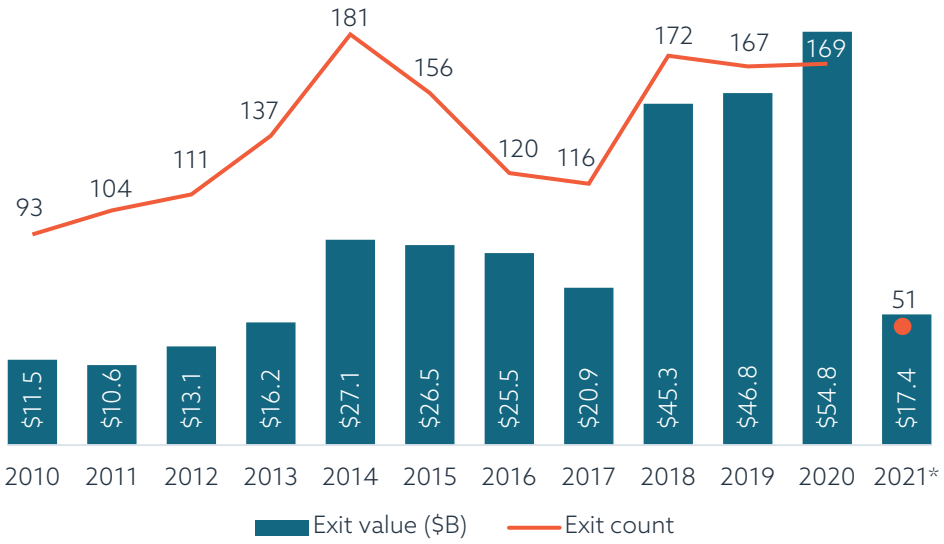
Market Analysis

Life sciences companies reached record valuations in Q1 2021, which underscores investor enthusiasm and perception of ultimate success. The median Series A deal size jumped from $12.6 million in all of 2020 to $20.0 million in Q1 2021, while valuations overall have risen at every venture stage. Granted, large financings—with six eclipsing $200 million in size in Q1 alone—has been able to exert upward pressure on even median financing metrics, so those figures could subside, but for now they speak to elevated demand from venture investors.

Such demand makes sense given the levels of liquidity achieved by life sciences companies for the past several years. The aggregate exit value was $54.8 billion in 2020, and the sector has already closed 51 exits for a total of $17.4 billion in value. Much of this is due to a uniquely strong equities market, which has propelled the proportion of exit value achieved via public listings to a record high. SPACs have also already yielded liquidity opportunities within the life sciences space. SPACs are likely to continue to play a role in the sector given that SPACs may fit many life sciences companies' business models well, being similar to traditional biotech IPOs.

As long as liquidity trends bode this well, capital will likely keep flowing into life sciences at an accelerated rate, especially when the sector is delivering breakthroughs in treatments, such as the now-famous mRNA-based technology that could be utilized in multiple applications.

Life sciences VC exit activity



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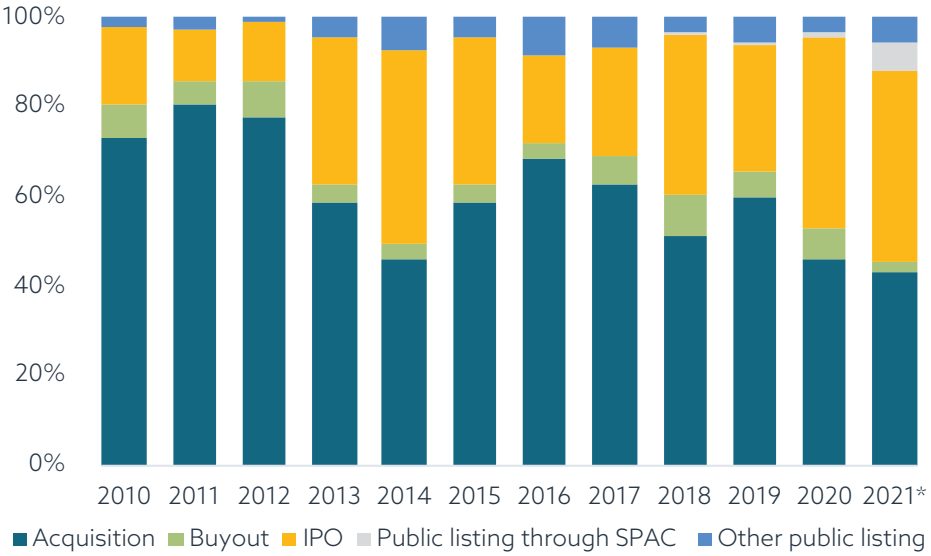
Life sciences VC exits (#) by type



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University Spinout Panel Discussion

Panel

Contributors

Robert Hershberg
Venture Partner,
Frazier Life Sciences

Craig Philips
President,
Kineta

Julie Sunderland
Managing Director,
Biomatics Capital
Partners

Mark Wisniewski
Senior Director,
Biopharmaceuticals
UCLA Technology
Development Group

Moderator
Neel Lilani
Global Head,
Tech Clients,
Orrick

Neel: Thank you to our panelists for joining us. As you consider how life sciences technologies are spun out from universities, are there any key actions leading to successful outcomes? Any pitfalls to avoid?

Craig: I'm thinking about this based on my time at the University of Washington working with startup companies. One of the factors that's really associated with success is when the technology has a team of people that understand the application of the technology not merely the science behind it. They have an idea of what the target application is going to be, and that the team is able to define how that application is different than what other alternatives are. I think the key success drivers are 1) really understanding how the technology can be applied is key, 2) having an experienced and multidiscipline group of people 3) having a well-defined plan for how you can advance that program to hit a major catalyst or milestone.

Rob: I think the UW is an interesting example. Tachi Yamada and David Baker asked me to join the scientific advisory board for the Institute for Protein Design (David Baker's institute) which has been a source of several recent spinouts, almost like George Church's lab at MIT. I think, to Craig's point, you see two categories of spinout companies. You see technology where there is a small team around it that is focused, that have a couple of applications and can really galvanize some early funding (either intramural or small amount of extramural resources) to get the program going). Those are ones that usually are taken up by a small group of entrepreneurs and carried forward. The alternative is a technology that looks really interesting; it could be a nice Nature paper--but it's without a team taking care of it. Those are ones that flounder a bit. I just spun a technology out of Cold Spring Harbor Laboratory in New York into a small neuroscience company. The technology was extremely interesting and resulted in an important Cell paper in the neuroscience field from Tony Zador's group. Still, it took a lot of thinking and a strong early management team to help get the technology launched into a company. I think it is the amount of very serious entrepreneurial effort around a nascent academic idea or asset that gives it the trajectory to either sit around for a while or actually making it out with some purpose.

Mark: To dovetail on these points, there is a major difference between a parallel versus a serial process with startup formation. When I started at UCLA TDG, one of my major concerns was companies formed with one faculty, one patent, one postdoc, and one SBIR grant which then fail due to a lack of management, resources, and funding. Another concern is Company formation which occurs in a serial process over an extended period whereby momentum is lost because of a lack of foresight or network to recruit seasoned management and smart money in parallel. Optimally, the IP license, management recruitment and fund raising should occur in parallel to launch a robust startup. The focus must be on creating a robust startup to have your best opportunity for success.

Julie: You have to have good science and you have to have good IP. The ingredient that really makes a difference is always the people, and they can make or break it. Our experience with GuideTx in its acquisition by Beam Therapeutics, which Dave Schulman just worked on, had really compelling smart scientists and a great delivery platform for gene therapies. But what Rob and I spent the last year working on was pulling together the right set of people. It's the right people that help you figure out what is a useful application of the science. If you don't have a clear view on how to translate that into something useful for patients, then it fundamentally is still a science experiment. These really super creative young scientists haven't yet had that experience that a David Baker or a George Church has where they've seen the pathway and the challenges associated with turning a scientific idea into something useful. So, helping to mentor some of those young scientists as they figure that out is something that I certainly enjoy and that Rob is particularly effective at. It really is a mentoring process around some of these young sciences that is both incredibly gratifying but also necessary in order to get something useful.

Neel: Are you looking within academia for the right founding team members?

Julie: I think it has to be a mix. It's hard to just pull some science out and package a management team around it. You need a passionate core founding scientist that really cares deeply about the science and pushes it hard. You can do it without that but having that makes it so much easier. With GuideTx, we had James Dahlman who was the professor at Georgia Tech who was very passionate, but as important was his postdoc Cory Sago, who was this 27-year-old kid who was just a machine. He cared deeply about the science. He worked on it 120 hours a week. He understood the science in a way that even though Rob and I are certainly experienced company builders, I still can't figure out how to make that science work. Finding a core scientist that cares deeply and is able to be mentored by really great people, then wrapping really great people around him or her is the path to success when you've got some great science and want to build a company around it.

Rob: I think what you see is venture traditionally stepping into this role of providing a degree of management around ideas. I think the best institutions and the most experienced (MIT is probably the best example) already have established a group of entrepreneurs and experienced money around these very early ideas. As I mentioned previously, I see the Institute for Protein Design at the UW as a good example where you bring in people that have some business experience to usher these ideas early, grab one or two scientists from the program and you can get it going. I think it's incumbent on the institutions interested in successful biotech spinouts to do the same.

Neel: Are you seeing venture funds stepping into advisory roles to help align the best talent to form successful teams? How does that process unfold?

Rob: Venture recognizes that new ideas in science often come from academic institutions and so they're trolling the literature. Often, a paper will be distributed to the entire venture deal team and someone will look at that and say "Oh that's interesting. Do you know anyone on this team or at this institution?" This is where the relationships really help. I also think that the institutions that have a few people around internally that are looking at their own portfolio and deciding on prioritizing what to do is really helpful. When I was at Cold Spring Harbor, they had a good track record with some really recent interesting companies, and I think could benefit from experienced entrepreneurs around to help them assess their interesting IP. The tech transfer offices can only do so much. Frankly, I would assume that Mark would want experienced management when you're talking about a licensing deal at UCLA. It's really a win-win here if the licensor if you have a track record of success. I could grind Mark down a little bit better than a new CEO could because I think Mark might say "Okay, if they've got a good team, the 2% looks better than 4% with a team that's never done it before." So, I think the system works much better when there's a bit of experienced management around early.

Mark: I totally agree. It amazes me how much time is spent on the minutiae of these license transactions when the priority should be on launching the Company and product commercialization. Being the University, we are here to support and this really brings me to the heart of the matter of mentoring faculty, as Julie mentioned. We want to establish relationships before there's some hot IP for licensing. For instance, UCLA TDG has a board of directors and after working and building relationships, they are starting to gravitate towards mentoring faculty because it's fun and rewarding. To me, it makes the most sense to build your networks and ecosystems in advance, so people know each other. Then, when something significant occurs "Aha! Now's the time to launch a new venture!" and not at the point of "Well, I've got this science paper or nature paper. Who's the team?" and you have to hope that there's camaraderie, alignment, and vision and that would have been inherently addressed if they had gotten to know each other earlier.

Julie: I totally agree with that, especially in the early stages. If you're in a transactional mindset, it really undermines the gelling that is important to the company's creation. I take the GuideTx experience where Georgia Tech was much more hands off. They were supportive but didn't have a ton of mentoring. Then I take the experience that I had with another company that was spun out of a highly-regarded lab at a major university with all the mentoring and support. I will tell you that the university almost killed the company. The transactional nature of the minutia associated with tech transfer made everybody miserable. I think it's the mix of the actual support from the university and the relationship building at the university-level.

Craig: I think one of the big challenges that startup teams face is access to advisors. If someone like Irving Weissman has a new idea, he has fabulous access and is going to have great advisors and essentially no issues in finding professionals across multiple disciplines First-time innovators from an academic setting face greater challenges, and where the success lies when that university has a strong infrastructure of multiple people to support some of the early discovery and early advancement. I was involved with one of the first Institute for Protein Design (IPD) programs that was spun out Ingrid Swanson Pultz's PvP Biologics which ultimately was sold to Takeda. In that program, I think the success occurred as there was dedicated and focused PI, as well as multiple that were there to coach, train, test, and challenge the team as they were advancing the project. At that time, IPD didn't have the big infrastructure that now is there to support these early innovations and the fact that it's been so successful allows them to have more support. I think it's this organic infrastructure that universities have to support broad-based innovation and early technology development and commercialization.

Neel: Regarding relationship between the university (specifically the tech transfer offices) and the venture community, from both an academic and investor lens, how meaningful are long standing partnerships versus reviewing technologies/opportunities episodically?

Craig: I think having those systematic touch points every six months or so is great. We've had some good touch points with some of the UW technologies, Frasier, Tachi, and Osage University Partners. Those are really valuable for us because it's one thing when me as an advisor tells the investigator "People aren't going to be that interested in this aspect. What they want to know is this." You know they hear me and they listen to me but then when they hear the same message from Tachi or from Osage, it has different meaning and it helps me press my agenda with them to get to that point. I think those regular interval touch points are incredibly valuable.

Mark: At UCLA, we've been establishing more regular touch points with venture and it is interesting because I think the benefit is more qualitative than quantitative. We record Professor Spotlights because we're in the entertainment capital of Hollywood, so we ask them to give us your research vision as a trailer. You only have 5 minutes. Don't start with the data but tell us what your vision is. What is your major programming, funding, and collaborations? That's the people side; and of course, the tech is also important. All of this helps us to evaluate and prioritize to put us in a better position to drive collaborations.

Rob: I think that, to the point that Mark is raising, Boston is the perfect example where there's a ton of technology and a ton of venture. I think where there's a great opportunity is for the smaller funds or the more regional funds to recognize areas that are a little less tapped and to do a little bit of extra work. A quarterly meeting reviewing a portfolio is much better than a single page sheet that gets sent out to everyone and everyone just deletes it from their inbox. The majority of things coming out of academics that the office thinks are valuable are, in my opinion, not as valuable to venture or frankly to biotech as the inventors might think. They're interesting ideas and interesting papers but you need a lot

more. It's that culling process to say "Yeah, out of the 50 inventions from our institution, I'm not worried about those 49 but am excited about that ONE that looks kind of interesting." Or to what Mark says, there's always a motivated and talented professor or two that are doing things that people are interested in and getting to that person's lab and figuring out whether there's a spinout or a roll up. Those are much more fulsome discussions than waiting for things to emerge.

Julie: As a venture investor or as a company builder or as a CEO, you don't actually do that many companies. We would essentially do one seed stage startup company a year and the amount of effort that we put into that is quite high. Let's again take GuideTx where it was a two-year process. I probably spent 20% to 25% plus of my time over the last year and I'm supposed to be managing the fund and doing other investments. The amount of time that you take when you're company building is significant. You don't want the 49. You want the one really good idea. The other reality is there aren't that many companies to build. There's a lot of science going on and it's great science but we're only spinning out a handful. How many drugs does the FDA approve per year? It's not hundreds. It's only a few and so you're looking for those. You're going to do all of that heavy lift with the support of the university to take it to the point where you can get to the starting line of starting a company. Then you have to go raise hundreds of millions of dollars to get it through the clinical process. We underscore these metrics, which is why I like what you said Mark in that it's not about the hundreds of meetings. It's really about the relationship building with the great PI's that are generating some really great ideas with the good company builders that care about taking science and making it useful and getting the support system to make that magic happen.

Neel: Do you see any issues with retention among the younger scientists within academia as they are attracted to different economic outcomes arising from spinning out companies?

Mark: I think new academic professors rightly believe they can have their cake and eat it too...and they probably can.

Julie: Yes, I would agree with that. James Dahlman was the founding academic at GuideTx. He's 30-something and super interested in startups. I think he played with being CEO but we spent a fair amount of time educating him as to what a CEO role would look like and how that matched up against his skill set. Following the acquisition and through that education process, he found that his inclination is to be within academia but with the freedom to spinout some of these great ideas. So, to your point Mark, James and his postdoc Cory were very different in that Cory is now leading a group at Beam Therapeutics and could not be happier driving the execution within a biotech company while James continues to thrive coming up with the next big idea that he will spin-out into the next company.

Craig: We're also seeing this entrepreneurial spirit is really driving some of the scientists. At UW, for some of their spinouts, they brought in some folks from MIT and from Columbia as CEOs. There are scientist postdocs at those other universities and they're looking for a technology that they can be CEO for. It's not necessarily their science but they have both scientific background and the entrepreneurial background and experience and fortitude to step up as CEO. I think we're seeing a whole new genre of scientist founders for some of those roles and that's really been valuable. If you look at David Baker's lab, it's a great example where a number of the scientists that are leading the IPD spinouts are not the scientific founders but scientists that have come along and are taking those organizations to the next level.

Rob: I think what's wonderful is that many of these institutions are embracing the contribution that this technology can have for mankind. Papers are fantastic, and discovery and academia are wonderful. But, in order to really translate this into human benefit in this day and age requires the capital and infrastructure of a company. I think any universities that embrace this and then recruit faculty with a goal of being at that biotech/academic interface is really an interesting transition.

Julie: This gets back to closing the circle on experience and building your team. When you've got these really dynamic young scientific founders, many haven't gone through the experience of forming a company. They think they need to be deep experts and they're sort of defensive about what they don't know. Helping them understand that they don't always have to be the CEO and that there are people out there in the world with deep expertise to help them in areas that may not be their strengths is vital. Being comfortable with what you don't know is a key personality aspect that is often in conflict with some of the scientific mindset. Just because you don't know how to set up a cap table does not mean that you are inadequate to start a company. The trick is how you put the right people around these great ideas to help them put the pieces together.

Neel: Have you noticed any data (real or anecdotal) pointing to stronger outcomes for companies that leverage technologies spun out from academia?

Julie: That's actually not something we even think about. From a venture point of view, you're in the flow of new ideas and what's going on scientifically and you have an emerging sense of what's important and then you just go track it down. You go to Mark's office and you say "I'm super interested in integrated approaches to gene therapy right now. What are the ways that we together can gather the pieces of technology around gene therapy?" I'll go and look at the people and read the papers and try to figure out who's active in this space and whether that's in a university setting or elsewhere sort of doesn't matter. A couple of our deals have been spun out of other companies. In the liquid biopsy space, GRAIL was spun out of Illumina and Thrive was spun out of Johns Hopkins. Both of those are great companies with great technology but you just go where the technology is rather than thinking about the source.

Neel: We've discussed Georgia Tech, MIT, Harvard and others. What other university ecosystems are you seeing a lot of strength around technologies being spun out? Are there other places that we may not be immediately aware of but should be paying attention to?

Julie: I would say there's been a concentration in the Boston ecosystem which is on one hand incredibly powerful and on the other hand a bit insular. One of the things that frustrates me a bit is that I live in Seattle and I have yet to invest in a Seattle-based company. That's not because of any lack of desire. It's just because it's hard when you choose just a few companies. The Boston ecosystem is producing just extraordinary science and extraordinary companies. My sense is that there is a huge untapped potential in these other centers where you're producing similar levels of science but not yet the number and scale of companies that the Boston ecosystem is producing. I've been thinking a lot about this and trying to figure out how to find the next GuideTx in Seattle? How do you go build those relationships in these centers where you can put all the pieces together? Where are we looking? On the West Coast, in addition to Seattle, we're looking at San Diego, LA and obviously, San Francisco. Johns Hopkins and the Penn system are also really interesting, and Georgia Tech would be the places that I would start to go try to mine.

Craig: I like Stanford. I think Stanford both on the medical side and the tech side has just been a great machine. One of the things that Stanford does, maybe better than most, is they have a strong infrastructure of supporting new technologies. I think innovation within the university can get early funding to make it to a proof of concept which allows it to move forward.

Rob: We all have examples of four years of negotiating with the university and not being able to get a deal done that sours you on a given region or institution. And, most of us know what's been picked over intensely over the past 10 years. Still, there is a ton going on at many institutions across the country that are ripe for collaboration and company formation. One has to be smart in terms of what the expertise is and to look for a couple of key faculty members. But then the real question is: "What is the tech transfer office like?" Because you may find that there's a new woman at a given institution who just came from has a gigantic lab doing exactly what you want. You go to the tech transfer office and your first meeting suggests that it will be a long time before you can get a deal done. It's matching not only the technology but also the maturation of their tech transfer office.

Mark: I agree with Rob. When I started at UCLA my understanding was that it had a bad reputation. Taking four years to get to the deal risks the whole thing is already obsolete. It is important to understand that universities expect to share in future success but it's also critical to facilitate closing the transaction and ensure that the "whole is greater than the sum of its parts" for all parties involved.

Julie: I do have a pet peeve with the general tech transfer system. If you're too much of a legally-driven versus an innovation-driven place, that's really going to kill you. The forward-thinking groups are starting to add in innovation funds, which you've done Mark; we are also encouraging UW to do as well. Even though the Osage group has some interesting partnerships with the universities, they sort of let the tech transfer offices off the hook from participating in the equity of spinouts. It really frustrates me that the tech transfer offices are not participating economically in the value created by these companies. The focus of the negotiations therefore becomes royalties and milestones payments which, although in a few cases can actually generate a ton of revenues in most

cases have very little value which is way into the future. I also recognize that there's a bunch of (especially with the public universities) impediments to actual participation in the equity of spinouts. Nonetheless, if the leading tech universities had actually taken equity in the companies that were spun out of their ecosystems, think about how much money they would have to re-invest in the innovation ecosystem. Instead, they argue over these less-relevant royalty terms that take a year and a half to finalize and aren't going to deliver them anything substantial. But I am encouraged by the shift towards the innovation-funding approach. When I was running the Gates strategic investment fund, we did take equity. Though that wasn't the purpose of the investment, we ended up making returns for the foundation that we re-invested in important initiatives like vaccinating kids. We didn't take equity because we wanted to make money, we did it because being an equity investor in these companies aligned our incentives around translating the technologies for good in the world.

Rob: That's the key point Julie. It's as much aligned incentives as it is economics. Then the institution and the new company are together in this. I think if institutions can get out of their way of negotiating 2.5% versus 2.75% royalties over a billion five dollars of revenue 15 years from now and focus on equity-sharing, that would change everything.

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CONTACT US

Gregg Griner
Partner
ggriner@orrick.com

Neel Lilani
Global Head, Tech Clients
nlilani@orrick.com

Gargi Talukder
Partner
gtalukder@orrick.com

Blake Ilstrup
Partner
bilstrup@orrick.com

David Schulman
Partner
dschulman@orrick.com

Stephen Thau
Partner
sthau@orrick.com

Scott Iyama
Partner
siyama@orrick.com

Shana Solomon
Partner
shana.solomon@orrick.com

Albert Vanderlaan
Partner
avanderlaan@orrick.com

orrick