



Podcast Episode #26 – Connected lab - a startup bringing IoT to R&D environments, with Alok Tayi of TetraScience, USA

RAW TRANSCRIPT OF INTERVIEW

Balint: I'm very glad to have Alok Tayi of TetraScience on the show. Welcome, Alok.

Alok: Thank you. Glad to be here.

Balint: We got connected via a long-term friend of mine, a mutual friend Yanina, who you know from Harvard where she was a postdoc, and to my understanding you were also a postdoc there, maybe even in the same group.

Alok: That's correct.

Balint: Yeah. Excellent then. I'm very excited to talk to you as I have a science background as well, just like you, and with TetraScience you're heavily relying on your background, on your strengths. I see it as one of your strengths but I want to talk about it later again, coming back to this point, so that we can get some understanding of your journey so far. Can you tell us about your entrepreneurial initiatives before TetraScience, as they look also pretty interesting, the involvements and the startups you initiated, and I was wondering how these can be connected with your latest initiative venture TetraScience?

Alok: Sure. So my entrepreneurial career began as a fluke when I was a Ph.D. student at Northwestern. I was doing my Ph.D. in Material Science and ended up coming across a flyer that someone from the business school was looking for some help with consulting for other big companies in engineering. And so, I ended up linking up with some folks from the business school and the chemistry department at Northwestern, and we started a company called PreScouter. PreScouter helps Fortune 500s find technologies at universities and startups across the globe, and we helped build that company now into about 150 employees, 350 Fortune-500-sized customers or so.

So it was a great opportunity for me as a Ph.D. student, a scientist to learn a little bit about building a business, doing things like sales and product development, and working with big successful R&D labs, CTOs, VPs of R&D, heads of business units, to innovate and identify new technologies for their products. So my entrepreneurial career began while I was a Ph.D. student and transitioned now into a full-time role where after spending some time at the University of Tokyo and at Harvard, where I



met Yanina, I started TetraScience with some folks from Harvard and MIT at the end of 2014.

Balint: Sounds very interesting. I like it this journey because your company, the Pre-Scouter, it sounds like a non-hardware company. So you could in a way ease yourself into the harder journey, which is having a hardware-software company because you're at the intersection of these two fields.

Alok: That's correct. I'd say to build a successful business one has to have tremendous execution across multiple fronts from hardware and software to sales and marketing to operations to hiring. My work with PreScouter gave me a good background in how to perform some of those core functions. But then second, dive more deeply into how big companies want to be able to buy technology and solutions to important technical problems. So, yeah, I was very fortunate to be able to, as you pointed out, ease into a more difficult endeavor with now a hardware component that is relevant for TetraScience.

Balint: What is your mission now that you started talking more about TetraScience? What is your mission with your company and how would you describe it, your initiative?

Alok: So our vision is to connect every single scientific experiment and instrument to a single online dashboard. Our goal is to leverage cloud software to provide executives, scientists, operations teams inside laboratories, the ability to remotely monitor, control and collect data from their scientific experimentation. We want to be able to provide that core software platform upon which one can perform functions like analytics, data integration, visualization and collaboration. And so, we very much want to be that hub of scientific data in the R&D laboratory, especially in the context of experimentation and data production.

Balint: What is your business model? I think it's a very important element of a business to make it to work.

Alok: Yeah. You're 100% right. I think what we've observed is that the business model can either be a point of friction or a point of acceleration inside organizations. Our business model is that we charge an annual software subscription based on the number of instruments that are connected to our software platform. So therefore labs that want to start with a small subset of instrumentation that they can monitor and collect data from and control will pay a smaller fee than those that have a larger collection. So our insight has been that the value inside of laboratory scales with the quantity of data that's produced. The quantity of data that's produced scales with the number of instruments one has. So that's been our business model is to keep it very simple and straightforward, which is an annual software subscription in that regard.



Balint: And in return for the annual subscription you provide service as well, right? I assume.

Alok: Yes, that's correct. So it depends on the specific functionality. It's a sensor, it's remote monitoring, data collection, alerts in the context of more sophisticated instrumentation. It could be a visualization, analysis and integration component as well.

Balint: Yeah, I see that as a quite attractive version type of a business model where you have this subscription-based feature, element, rather than having a one-time sale of the instrument. So I think it sounds very interesting for sure.

And what were the steps of founding it? I think it's always good to break it down so that we can all learn from your case and from similar cases. You mentioned your journey to TetraScience but what were the smaller steps? So, for example, how did you come up with the idea? Did you have like Eureka, an aha moment? And also how did you validate that this could be a viable idea, including maybe talking about the price point?

Alok: Yeah. It's a great question. And I think... So there's a couple of pieces to that question. So let's start with maybe how we had the idea and how we perhaps began the company, if that works.

Balint: Yeah.

Alok: Cool. So the idea came....It was something that I've been working on myself for quite a while in that being born and raised in America, most kids when they're young, their first job is doing a paper route, delivering papers door to door. However, I had a misled youth and my first job at the age of 16, however, was doing lab automation for nanotechnology. So I started very young building hardware and software to test nanomaterials and how they interacted with dangerous chemicals. From there, I did my undergrad and Ph.D., I was a visiting fellow in Japan for a little bit and then came to Harvard. But while I was at Harvard having had a lot of experience about 15 years or so in scientific research, I was trying to perform a really simple experiment called electroplating. Electroplating as you may know involves coating one metal with another. It's quite literally a centuries old experiment.

Yet, in the academic environment each of us as scientists are really expensive when you consider overhead, and to run this one simple experiment it took two scientists two hours to run this age-old test where I had to sit there with a glass thermometer, monitoring the temperature of the chemical experiment and I had to scream it out to my colleague who wrote down the data points in pen and paper. And so, that was the Eureka moment. We said when we have capabilities like Nest, the smart thermostats in the home, the function and the value of that same capability in the laboratory how-



ever is literally 100 times higher. So that was the Eureka moment, which I had in February of 2014. Later that evening I had dinner with a colleague of mine also from Harvard who ended up being one of my co-founders, Sal, who was doing optics research at Harvard, had previously built scientific hardware.

And later that quarter I had met my other co-founder, Spin, who had previously been building web-based software and was a MIT Ph.D. student in electrical engineering and computer science. And so, what I recall is that when you think about what it takes to build a good business, in our case Sal had a hardware experience, Spin had built software experience and I had done business development work before. We became the right trio to start this company and build it initially.

So that was right in the early to mid-2014 timeframe. We then started having some discussions with potential customers and contacts we had in the Boston area, especially in pharma and biotech, and then incorporated the company at the end of 2014. So that's a little bit of our founding story and a little bit about the Eureka moment that we had that helped catalyze this movement that is TetraScience.

Balint: And what about validating this idea with actual customers? Because right now you have the customers, the labs, R&D labs, research environment. So what process did you follow there?

Alok: Yeah, it's a great question, and I think from my previous entrepreneurial experience I knew that customers were a very critical part of validating whether we had a real business or not. The way we did that was to actually spend a lot of time talking with other scientists from a different segment of the research landscape. We spent about half of our time with corporate researchers, so in companies like pharmaceutical, oil and gas and chemical companies. We then split the balance between other industries, smaller companies as well as academic institutions. And so, our goal was to very much start talking with them to understand what some of the pain points are that they had, how they purchased software or hardware, and also the quantity of dollars they had at their disposal to bring in new types of technologies. And so, it was from that initial set of interviews and discussions, we probably spoke with about 50 or more scientists and laboratories that allowed us have the conviction that there was a real business opportunity behind TetraScience.

Balint: Then it's a... You covered it with 50, with the number 50, quite a big portion of the cases, I assume, because they say roughly it's like a rule of thumb that you need to have something like 20 interviews at least to cover maybe 80% of the cases. So you really made sure that you have a case there, a business case.

Alok: Absolutely. I'd say one thing is that in science there's many different types of science as you know, from physics to chemistry to biology, and therefore we wanted



to have a much broader view of the number of scientists and the number of laboratories, given the diversity of science and research that's done.

Balint: And what about the, it's quite a specific question, validating the price point?

Alok: Yeah, it's a great question. What I had recalled from my previous company, PreScouter, is that price point and time to sale are often correlated. And different parts of the organization from executives to scientists who work at the bench have different quantities of dollars that they can spend, different budgets. So when we started the company we tried to price the software and the hardware within a dollar amount that made it very fast and easy for an end user, a customer to purchase the technology.

So that ended up ranging from say a few hundred or few thousand dollars for an academic scientist to maybe tens of thousands of dollars for a manager in a pharmaceutical company. And so, we never wanted to wait a very long period of time to make a sale. Therefore, we initially started with moderate to low price points to start getting traction in the market. Now we have customers that range from tens of thousands of dollars a year in software to millions of dollars a year in software revenue. So we've really been able to demonstrate that by starting at a small to moderate scale the customer can find a tremendous amount of value and then scale up the use of that technology across their organization.

Balint: Yours is not an easy case because it's a multi-stakeholder case because you have the end user but he is not the person really buying it. He has to convince his boss in a sense. So it's not an easy thing to do. This is basically, I would say it's a B2B, right?

Alok: You're 100% right. That is a B2B sale. In addition, we have to think a lot about some of the same points you mentioned a moment ago. We do have to think about the different stakeholders inside laboratories. It could be scientific teams, it could be IT teams, it could be executives, and therefore I think from our approach it has always been to leverage our software to focus on those managers and executives who have a tremendous amount of responsibility not only across the science, but also across the budget and compliance. So those men and women tend to be great people for us to talk to because they have a view not only of what needs to advance science but also what is needed to operate a successful business as well. So we've tried to keep both of those aspects in mind and keep a very simple, very value-driven value proposition.

Balint: At the beginning I mentioned strengths point, that one of your strengths is that you have the scientific background and this helped you, I mean you mentioned that when you were 16 you were already doing some lab automation work as a kind of



intern or as a student project. What kind of other strengths do you see that helped you with each of these initiatives? Because I had a look at, for example, this other project or other company, Proper Channel, where you are looking at the process, you're analyzing workflow, and that, in my eyes, also helped you with TetraScience too, because for weighing on your website you described the steps that researchers have to take. So I definitely see that you're looking for some symbiosis in terms of the projects and activities you start. So you are very well aware of your strengths, I assume.

Alok: Well, I appreciate that and I would be dishonest to say if I did that intentionally or it was done with some purpose in mind.

I had met with Will McCluskey here in Boston and he's done some great work with Proper Channel and I was fortunate enough to help advise and provide some feedback on the business. But from my perspective, I think the skills that one needs to bring to the table when building a business, the ideal case is if you are the best and the most world-class engineer, product manager, marketer, salesperson, recruiter. But the reality is that it's very difficult to have all those skills in one person. So I'd say from my perspective, there is a really great article written by Marc Andreessen several years ago about how he had felt that the best entrepreneurs were men and women who were experts in one domain but had a complementary set of skills that they were simply ok with.

And so, for me personally I think my scientific pedigree and background happened to be a core deep domain where I had excelled but that this experience in sales was a compliment to my initial experience. And so, those were I think the skills that I had brought to the table but also I tried to be sufficiently self-effacing to know where I did not have strengths. And so, my co-founders, Sal, for instance, had built scientific hardware for 15 years and then previously done big data work at Micron Technologies. My other co-founder, Spin, had done sensors research and built web-based software. So I think it's really critical to make sure that as an entrepreneur that you are surrounding yourself with world-class people who have complimentary skills than your own.

Balint: Yeah, I agree. Also the number three for co-founders is pretty ideal. I hear it many, many times in articles when discussing with entrepreneurs, very successful serial entrepreneurs, I also discussed it in one of the episodes that this way when you have to make a decision, you have an odd number so you are not stuck with a decision and for a startup, the speed for decision making is extremely important.

Alok: Yeah. You're very much spot on and I think that's certainly an advantage is the agility that a young company can provide.



Balint: And plus, of course, the complementary skills so you cover all areas.

The other thing that I wanted to bring up is that in episode 17 I had Mike Vladimer from Orange IoT Studio, which is the innovation office of Orange, the telecom company from France, and he is responsible for IoT field. He mentioned that there are...We discussed this topic with him and he has a framework, three layers, that he described and I see it as parallelism between his way of thinking and also your IoT product, IoT solution. So one was solving a compelling problem with your case and you are solving a compelling problem, as I see it. The second is that you don't require the users to interact and make a lot of effort to set up the device, so yours is plug-and-play.

And also that he mentioned the third point, which is that many times a successful IoT product has four things that some of these four things come up but I'm not sure about this. For example, this one aspect is a device ecosystem. So this means that when you have multiple devices that you take care of or you look at, you get intelligence that you would not get otherwise by looking at these individually. So how do you see all of these? Do you cover all of these areas with your product? Or why do you think that your product, your IoT product, has a strong case?

Alok: It's a great question. I think when one works in the area of the Internet of Things it's super critical that one focuses on a user case, on a problem that people care about. So I think in the context of IoT, our thesis is simple: we don't believe IoT will be ruled by one company across all industries but rather that IoT only creates value when one combines the connectivity with an innovation in the workflow and a business model that's relevant to the end user.

And so, in our case the workflow that we're looking at is the processes of doing science and discovering medicines, for instance. And so, our business model as we talked about before was also this subscription approach, which makes it very fast and inexpensive for companies to get started. And since we can easily retrofit existing instrumentation devices and collect data into a central location, it allows us to align ourselves with the end users' existing workflow and the way they want to interact with our software.

And so, I very much agree with Mike's description of IoT where IoT can create value. I think we're certainly focusing on the IoT vertical specifically for scientific R&D. Moving forward, I'd say you touched upon a couple of really critical points, especially around ecosystem. One area where I think we have a unique compelling opportunity is that there exists hundreds to thousands of different suppliers of scientific instrumentation inside laboratories. We've been partnering with those manufacturers of devices to enable them to provide cloud-based software and services with their instruments natively from day one. And so, we've seen a huge amount of opportunity to



partner with those manufacturers not only to add more value to their devices but secondly to solve a key critical problem for their end user, their customers. And lastly is to develop this ecosystem of instrumentation in the marketplace.

Balint: So you do cover both, the retrofit but also for the new products as you mentioned the instruments.

Alok: That's correct.

Balint: Yeah. Let me a little bit change just a little bit the topic, which is now going back to the development because you have this hardware, the TetraScience link. What kind of issues did you see that came up, hardware issues, manufacturing issues during the development, when you were trying to validate the prototype, then you had the works-like, looks-like prototype, engineering prototype and so on?

Alok: Sure. I think your instincts are accurate that hardware is a completely different beast than software. It was the first time my co-founders and I had brought a hardware module to market at scale and we learned early on that when we tried to build the initial prototypes and the initial devices what worked well for us was leveraging some of the commercial electronics that were available to be able to first enter the market in an expedient way. As we started to experiment and deploy those devices across the marketplace, we observed challenges that existed with connectivity and reliability. And so, the commercial devices that we were going to work with subsequently evolved into designing and manufacturing our own hardware module called TetraScience link. This too was a unique process in that we built from scratch and designed from scratch the PCB, the electronics and the manufacturing as well as the quality assurance and the testing as well. So it was very much a learning experience and I think a big part of it was... We had to do more work in order to ensure that we were keeping within certain cost constraints. We were making sure that they had appropriate timelines as well as using our own manufacturing and design to ensure reliability and scalability of these devices as well. So those were some of the key learnings we had from starting with hardware almost two years ago now.

Balint: That was very good.... It was a good point that you made that you started with commercially available electronics components because there was this article, this news, I think it came out in Bloomberg, that I think it's Juicero, this juice pressing hardware startup, hundred and twenty million has been invested by VCs. And they analyzed it, Bolt, Ben Einstein, there was an article on Medium, where they say that even for the first product they came out with customized components, which are very expensive and you try to reduce, lower the risk by starting out with a commercially available component. So that was a smart move.



Alok: Yeah, absolutely. And I think most folks are trying to use money as a way to accelerate their time to development. In our case, though we invested a lot of our personal savings initially, we wanted to use customer feedback and customer purchases to validate our approach and our technology. So that happened to be our approach. I think we were also fortunate that there existed a vibrant community of commercial electronics that we could leverage. And I think that also helped with us from time-to-market perspective.

Balint: So, Alok, there is the one thing that struck me. I was looking at your blog. I liked Ted Roosevelt quote. Just a part of it, which stayed in my head, is that “there is no effort without error and shortcoming.” I like this quote on your blog and there is a related question which is what mistakes did you make along the way, along your entrepreneurial journey that helped you to learn? Because many times we learn from our own mistakes.

Alok: Sure. To be honest, I think there are probably too many mistakes to cover off in such a short period of time. I think it's hard to build something of importance if you don't make some errors and mistakes along the way. I think we touched upon a moment ago how some of the challenges we had around hardware and design, we were a young, inexperienced team doing that and we certainly perhaps took a little bit longer and spend a little bit more money to do that the right way the first time around which I think will certainly correct in the future.

I think when we think about our organization, which grew in the year one from three people to year two to 10 people and now we're 25 employees, I think one opportunity and mistake I personally made also is not communicating well enough and setting up that communication infrastructure inside the company. As one grows and as different departments from marketing and operations, engineering and sales, of product and back office evolve it's really critical that we have a very transparent and obvious way that communication and ideas are exchanged across the organization. So those will be sort of two sets of the areas where off the top of my head I would cite as being mistakes that we made early on. Not having the right experience of the table in the context of manufacturing but then second also thinking through how we deliberately communicate across our enterprise.

Balint: Yeah. Thanks for the honesty about these because, again, we can all learn from it. We can try to avoid this way mistakes when we step into similar shoes as you.

Alok: Absolutely.

Balint: Yeah. During the development and now during the interview you briefly mentioned that you were financing the company partially from your own pot but I saw it



that you were also at the same time at some point a Y Combinator program graduate from 2015 summer. And I've interviewed a few accelerators so far, including Brinc from Hong Kong, which is specializing in IoT products as accelerator or also Kickstart Accelerator from Zurich. And I was wondering how you benefited from participating in this accelerator?

Alok: Yeah. We were really fortunate to participate in YC. It was actually a last-minute decision to even apply. We learned about it the day before the application deadline and we're fortunate enough to get selected for an interview and then subsequently get accepted to the summer 2015 program. YC was a great opportunity for us in multiple different ways. The first is that it brings together some of the best companies from across the globe. There were companies from Scandinavia, from India, from Indonesia, obviously from the US in our batch and it really gave us a great sense of what world class really meant.

The second is that I think they have a great framework around really being focused for a short period of time, three months, around the critical features that help build a business and much of it relates to customers and revenue. For us, in addition, I think it also provided us a great visibility in the startup landscape for how a young company with Harvard and MIT pedigree can actually leverage software in a little bit of hardware to create disruptive business. And so, I'd say those were the key things that we sought to get out of the experience. The first was to be exposed to some of the best companies in the world. Second is to have a laser-like focus on building a great product and getting good customers. And lastly is raising the profile of what we were doing in the marketplace.

Balint: Do you know, by the way, Click & Grow? Because they...

Alok: Yeah, absolutely, yeah.

Balint: I've recently interviewed them on the podcast.

Alok: Awesome. Super cool, super cool guys, really cool business. We were really fortunate, and like I said, world-class companies in the batch. So Mattias is a great example of that.

Balint: I agree. Mattias Lepp. So I would now say let's move on now to the last round of questions. So this means that I would ask you four questions and it would be great if I could get relatively short answers.

Alok: Got it.



Balint: So the first question is that if you could time travel like in the *Back to the Future* movie, which is one of my favorites, to the time when you were younger, much younger, in your 20s, what would you give yourself?

Alok: I would tell myself to have more fun and to work a lot less. Yeah. That would be my one piece of advice.

Balint: Yeah, interesting. Based on your pedigree, your career, I can see that it's a valid point. The second is books. Can you name a book that was important for your journey, for your entrepreneurial career especially?

Alok: Can I name three?

Balint: Just one. One or two.

Alok: OK. I would say the most impactful would be first a book written by Clayton Christensen, one of the canonical thought leaders in the area of innovation who wrote a book called *How will you measure your life?* And that would be, I'd say, a really critical book for me in my professional development.

Balint: Yeah, I've seen that there was a YouTube video where he gave a presentation on that. I think maybe there is even TEDx or TED talk but I haven't tried the book yet. I will put it on my on my list for sure.

Alok: Please do.

Balint: Yeah. The third question. Habits. What kind of a habit do you have, work-related especially?

Alok: Oh, I'm going to be honest and say that I don't have some great habits and that I'm not the most disciplined person in the world. My morning, I wake up, I check my e-mail, I get ready and I come into the office. I think the things I do habitually are to my girlfriend's would be to check my e-mail and my texts on a frequent basis.

But I try and I need to try harder to be less task-oriented and more people-oriented about men and women who I work with and who our customers are. But then, secondly also focus a lot more on aspects like communication and vision and values as well. So my current habits aren't the best but I definitely think there are some opportunities for me to improve too.

Balint: Yeah. It's hard to balance everything and at the same time being responsive to your customers and to your employees. The fourth question. You said that you were in the Y Combinator program which had a world-wide group of companies participating and also your customers, I assume most of them are in the U.S. but you do interact also internationally with the research institutes and also you mentioned your



company before that you had, the PreScouter. I was wondering what kind of cultural differences have you seen that struck you that you think were memorable that you overcame?

Alok: Could you clarify? Do you mean cultural differences when working with folks overseas or...

Balint: Yeah. With different cultures, so people from Europe, from different parts of Europe interacting with them, with customers.

Alok: Oh, interesting. OK. I'll be honest and say that my experience has been that there are far more similarities than there are differences, at least amongst scientists across the globe. I think we are all independent of geography data-driven people, folks who work very hard, try to be intellectually honest with ourselves about right and wrong.

And so, I'd say those are some key critical similarities that enabled us to work seamlessly across borders. I think we can all cite some of the more common differences like language and time zone, and things like that. But I felt at least in the context of science given that it is indeed a global enterprise that there is far more similarities than there are differences. I'm sure whether you're a scientist in Spain, or Brazil, or Hong Kong, or here in Boston that you're surrounded by really smart men and women who hail from geographies outside of your own nationality. And so, I think it's that geographic and that global perspective that science brings and that science really is that makes those similarities.

Balint: Yeah. This is why there are basically many people, scientists working in different countries because it's easy, relatively easy due to do science, the language of science and data driven nature of working.

Alok: Definitely.

Balint: So before now closing off this interview just one more question, it's regarding availability and reachability. What is the best way for the listeners to reach you by email, social media?

Alok: Yeah, I'd say Twitter might be a good venue. So at #TetraScience or at #Alok-Tayi would be once. I'm also available by email. But I think social media sounds like a good place to start.

Balint: Excellent. Thanks a lot, Alok, for this very illuminating interview on your journey, which makes sense to me very much. And also on TetraScience, which to me looks like it has a bright future attracting talent and VCs.



Alok: I appreciate that very much. We'll have some really exciting announcements to make in the coming weeks and certainly appreciate your time. And if there's anything else we can do to help with your podcast, we'd love to do that.

Balint: Yeah. Thank you. Thanks a lot. Thanks a lot for checking out this episode.