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OBY: From the campus of Harvard Medical School, this is *ThinkResearch,* a podcast devoted to the stories behind clinical research. I'm Oby.

BRENDAN: And I'm Brendan, and we are your hosts. *ThinkResearch* is brought to you by Harvard Catalyst, Harvard University's Clinical and Translational Science Center.

OBY: And by NCATS, the National Center for Advancing Translational Sciences.

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Here at Harvard Medical School, the visiting research internship program, also known as VRIP, is an eight-week mentored summer research program. The program is designed to enrich first and second year medical students interested in research and health related careers, particularly clinical and translational research careers. Each summer, VRIP scholars are paired with a medical school faculty member to conduct a clinical research project and receive mentorship. Past guest and assistant professor of radiology, Dr. Alex Lin of Brigham and Women's Hospital, is a longtime VRIP mentor and has returned to *ThinkResearch* to discuss the relationships between the scholar and research mentor that lasts far longer than one summer.

Welcome back to the show, Dr. Lin. Great to have you back. How have you been during this time?

ALEXANDER PETER LIN: Good. Thank you very much, Oby. I really appreciate the opportunity to come back here. It's a difficult time for research obviously given the coronavirus and the self-quarantines that we had to do. So we're all working from home, but we're doing the best we can.

I think it's been interesting. For those who have listened to my podcast before know that we do a lot of work with concussion research looking at brain metabolism, and obviously it's a time when no one's getting concussed because there's no one playing sports. So it's a good thing, right?

OBY: Yes, exactly.

ALEXANDER PETER LIN: So it's been interesting. We've had to pivot in certain ways. So one of the things, unfortunately, is that there's a rise of domestic violence due to everyone having stay with their abusers, and so we're kind of using that to look at some additional research in that area. But we just do what we can to try to keep things moving forward.

OBY: So you're part of the visiting research internship program. How did you get involved with that program? And maybe you can tell us a little bit about the program first--

ALEXANDER PETER LIN: Sure.

OBY: --and then how you became involved.

ALEXANDER PETER LIN: So the Harvard Catalyst program, actually, I think at the time that I had joined it, was actually a two-part program. There was the visiting research internship program and then the summer clinical translational research program. The [INAUDIBLE] what we call VRIP, the V-R-I-P program, was recruiting medical students, and the SCTRP program was recruiting college level students.

And I think it's a program that's just fantastic in that it obviously-- the aim is to try to give opportunities to those students who normally wouldn't necessarily have these kind of opportunities, so a lot of the students were recruited from underrepresented minority populations from schools that obviously focus on those kind of students. But I mean, I want to emphasize that, by all means, these are the highest caliber students in the program. And so it's just really giving opportunity for those people who are recognized by the program to have great promise to fulfill that promise, and so it's a really just fantastic program to be part of.

OBY: And how did you get involved in the program, and what brought you to be a mentor and then even to continue to be part of the program?

ALEXANDER PETER LIN: Yeah, that's an easy one. So I've always been a part of summer internship programs as a mentor in my previous lab. And so when I came to Boston in 2009, I very quickly looked to see, OK, what kind of opportunities are here? And the Harvard Catalyst Program was certainly one of the ones that was one of the premiere opportunities to be a mentor and, of course, getting a chance to meet Carol Martin.

Carol Martin was the director of the VRIP and SCTRP program and sadly passed away last year, which is a great loss to the program. And I mean, I think-- I certainly hope that what she established in the program will certainly be carried on. As we mentioned earlier, the seminars that she would hold for the students, I think, was so important.

But what I think set apart Harvard besides those aspects of it-- what really set Harvard Catalyst apart was Carol's touch. She was just-- she was so very, very passionate about these students and cared so much about how they're progressing. All these kind of programs do some kind of mid-term review, and that's fine and dandy. But Carol would come in. She would sit down with me for an hour to talk about what's going on with a student, and then we would sit down with the student for another 30 minutes or so just to go over what we had discussed.

And that-- it was such an in-depth review of students. I couldn't get away with just like, oh, yeah, she's doing fine. We're done. [LAUGHS] Carols would never allow that.

She would really get into the details of all the students, their histories and stuff like that that certainly helps me better understand what's going on with the student. I mean, we never really had any major issues. And I've got to say the [LAUGHS] icing on all that was that she'd always bring-- she was an amazing cook.

OBY: Yeah, she was.

ALEXANDER PETER LIN: As a baker, she was unsurpassed. And she'd bring these little lemon squares to our meetings.

[LAUGHTER]

I'm telling you, I could go on for hours with her talking and eat those lemon squares. That was just fantastic. So I think that's another aspect of program I certainly will miss. That's going to be a hard one to replace.

OBY: Can you talk about what some of the overall aims of the VRIP program are? I know you talked about who you're recruiting and where they are coming from, but what are-- what do you want them to achieve? What's the end goal of them being in this program?

ALEXANDER PETER LIN: Yeah, that's a great question. And obviously, of all internship programs, the idea is to give them an experience that will be of benefit to them in the future, and help them decide on what their future in research is going to be, and introducing students to what research is like. And I think that can be done on really multiple levels, and this is what the Harvard Catalyst program does so very well is that they really prepare the students to be in this kind of environment.

Now it can be very intimidating, as you can imagine, coming from an environment where these opportunities may not exist, and soon will be thrust into the so-called Harvard world. And it can be intimidating, but I think the Catalyst program does a wonderful job preparing them. I think one aspect of the program that I've always really appreciated was how they-- how Mrs. Martin would talk to them a little about professional communication-- how to dress, how to write emails. I mean, these all sound like little things, but they're actually-- they make a really big difference. And so these seminars that she would have throughout the entire program would help build these things-- how to manage your time and how to do the more basic stuff, like how do you do research through literature searches, how do you do statistics, those kind things.

All these things are really important aspects that they built into the program that provides structure and that for the students. The end product of all this is students have to give a presentation in Gordon Hall. And for those people who may not be familiar with Gordon Hall, it is the center of the Harvard Medical School campus. It is this big massive conference room with this dark mahogany type furniture, and you have, all along the walls, the previous past presidents of Harvard all staring down at you. It's probably one of the most intimidating environments you could possibly be in, and-- but that's so-- that's exactly what this program is like, right?

I mean, it's to challenge these students, to put them in situations that they certainly wouldn't be put in before, and to allow them to flourish in that environment. And so they all give 15-minute talks-- 15 or 20-minute talks, have a question and answer, where we always have several of the faculty there to quiz the students, and they all just do such a fantastic job. And of course, at the end of it all, there's this beautiful spread of all this gorgeous food that she-- that Carol put out for us.

And we get to relax afterwards and congratulate the students on their effort. I mean, it really is such a wonderful culmination of the program because it just demonstrates the great achievements that these students have made. And to be honest, if you can give a talk in Gordon Hall, you can give a talk anywhere else.

[LAUGHTER]

It's really one of those great experiences that really prepares the student for their futures.

OBY: That's fantastic. And now with a little bit more of that information, can we go back to talking about your past mentees? And I want to make sure that I'm pronouncing his name correctly. [? Saee ?] is what you all were calling him, his nickname.

ALEXANDER PETER LIN: Yes. Yeah, [? Alusaee ?] is his full first name.

OBY: [? Alusaee. ?]

ALEXANDER PETER LIN: But we called him Saee. It was in 2010 that I had my first student, [? Saee. ?] And you really couldn't start off with a better kind of an experience. So [? Alusaee ?] or [? Saee, ?] as we called him, was a student at Howard Medical School at the time, so he was part of the VRIP program.

And he was also a US Navy cadet at the time. You couldn't have asked for more polite, hardworking, and just brilliant young student. And to this day, we continue to keep in touch, and it was just such a fantastic experience.

He ended up doing some work in concussion research. The research that he did focused on our veterans coming back from wars in Iraq and Afghanistan, and he was measuring brain chemistry and looking at the changes. One of the big problems coming back from the war that certainly he recognized was that you have this problem that you have both brain injury due to IED blasts or those kind of incidences that occur in battle and then the PTSD, the post-traumatic stress, that they get from the experience having an IED go off and perhaps killing a fellow soldier.

And so that makes it difficult to treat the subject appropriately because you don't know how much of their injury is due to brain injury versus post-traumatic stress. And I think having [? Saee ?] being a US Naval Officer really helped provide us insight for us in terms of understanding what is it like to be a soldier, and for researchers who have no military personal experience, this kind of stuff is really just valuable in helping inform us. He went on to do-- be a Naval flight surgeon, and that he's now at the Naval Medical Center in San Diego at Balboa. And so very proud of him. Just recently married, and just doing fantastic work over there.

Yes, so [? Saee ?] was fantastic. And like I said, I really had low expectations after that because how do you possibly beat someone like that? But then we had Anna Cadenas. And she came from the University of New Mexico, so she was a college student. This was part of the SCTRP program, and this is, again, was just an amazing student.

Anna came to us very quiet and probably a little bit intimidated initially when she entered the program, but, boy, did she blossom. We started her on one project in Alzheimer's disease, and then about three weeks into the program, she's like, OK, I'm done. What's next?

[LAUGHTER]

This is a person who really had no experience before in research, and all of a sudden, she was just fantastic and ended up finishing three projects in the time [INAUDIBLE]. She looked at Alzheimer's disease, schizophrenia, and brain injury during her time here, so it was fantastic. She's someone also that I've kept in touch with, and she invited me later on to go back to-- to go to her university, New Mexico's university to give a talk to their RISE program, which is sort of an equivalent to a summer internship program.

And it was a real eye opener to see sort of the kind of environment that she came from. And to see her rise through that, the challenges of that environment, is really just incredible. And that, to me, is, I think, one aspect of the program that you take these students that, again, might not initially have these opportunities and really push them to do new and great things.

And Anna has certainly done that. She's now-- I think last time we spoke was looking at graduate school, and had gone abroad to do studying and teaching. And this is from someone who never left New Mexico, the confines of her city, in the past 18 years of her life, and all of a sudden because of the Harvard Catalyst experience, I think gave her the confidence and the knowledge of how to be more independent and achieve the goals that she wants set out for herself.

OBY: That is amazing to hear about both of those mentees you had. And what do you think-- I know we talked about the overall program, what the aims and the goals are, but what do you think the students have gained from the program? I know you've talked about Anna and [? Saee. ?] And are there any other things that you think they've gained from the program? I think there's so much richness in what you were talking about about even the skills that Carol was teaching them about how do you write an email, the professionalism aspect of this, but are there any other things that you would add that they've gained from the program?

ALEXANDER PETER LIN: Yeah, I think everyone obviously takes a little bit something different from the program, but one of my favorite stories is of Malcolm Reed, who was also a SCTRP program. He was a Princeton University student, and he came into our program. We started him first on a kind of medically related program, and then we realized he actually had some strong programming skills.

And so we said, well, you know, we've been having this real issue with our post-processing. It was taking hours to process our data. Maybe there's a way we automate it and speed it up. And he took that on in a major way, and took our data processing, which was taking, like I said, hours down to minutes by automating a lot of the procedures. And we were just blown away by that.

And I think from his standpoint, and I have to say I'm a little apprehensive saying this online because I'm sure his parents had-- I mean, he had goals to initially go to medical school. His father was a surgeon. And he just did a complete 180 and applied for computer science.

That's cool, so I-- I'm not sure what his parents think about it, but I certainly was really proud of the fact that the experience he had was so defining that he decided to completely switch careers. And now he's actually over at Google developing software for them, so he's certainly done very well for himself. And I'm really proud to say that I think his Harvard Catalyst experience helped contribute to that-- those decisions.

OBY: Wow. That's incredible. And even through all of these pass mentees you're talking about, you keep talking about this lasting mentor-mentee relationship and that you're keeping in touch with them. Why do you do that? Why is there continuity in it? I think, full disclosure, we all had a conversation before, and I really loved how you were talking about how you keep in touch with your mentees and even through this strange time how you're keeping in touch with the people who you may regularly work with. And why is that important to you, and why do you continue to do that?

ALEXANDER PETER LIN: Yeah, I mean, I think that's the aspect-- if you were to ask me what do I get away-- what do I get from this whole experience, that's exactly that. It's the opportunity to just be with these great minds-- these great young minds and watching them grow is probably the most amazing thing to a mentor is that you get a chance to see how they've developed. For example, I think Grace [? Ahn ?] was a part of our SCTRP program in 2016. She went on o-- she was at the time at Cornell University.

She ended up going to NIH to do research. We kept in touch there because we happened to be in the same building when I was at NIH when I had done my internship over there. And then she went on to do a Fulbright scholarship and then went to UCSD Medical School. So, I mean, just watching her grow through all those different steps and supporting her in as many ways I can-- and I helped to write a letter of recognition for both her Fulbright and for medical school, guide her through what my experience at NIH-- that's all been just fantastic. And it's just the opportunity to be with these kind of students and watch them grow through the years that is the kind of benefit of being a part of the Harvard Catalyst program.

OBY: Wow. That's amazing. So, I mean, obviously for all of us, this year is looking very different given everything that is going on with COVID and just rethinking how we are working, and living, and interacting with each other. So what does this year's program look like?

ALEXANDER PETER LIN: Yes, so it will definitely be a different-- a very big challenge, obviously. I think, one, we'll be starting very much later than I think we normally do. And, two, because we're still trying to minimize the amount of interaction that is occurring-- I know, it's still, I think, unknown at this point exactly how things will be handled and that. We're trying to do as much as we possibly can remotely, and that's very challenging because obviously the whole point of these kind of internships is the interaction between the student and the mentee-- mentor-- I'm sorry-- mentor and mentee. And that's very difficult when it's just doing it all remotely.

One of things I'm hoping we do, as you mentioned a little bit earlier-- one of things I like to do to try to maintain at least the social aspects of all this is we do a daily, what we call, tea time, where I just keep Zoom open, and anyone can wander in and chat with me about anything they want. It doesn't have to be about work, but I think it's that kind of thing to-- because in my lab, that's what I have. I have an open door policy, and so students can always feel free to kind of wander in, and talk to me, and chat with me about anything, any questions that they have, and that kind of thing. And I think that's really important to try to maintain that in any way possible.

So this is our Zoom way of doing it. Of course, I'm always available by email, and phone, and everything like that as well. But, yeah, that-- I mean, I think those are the kind of things we have to do to try to maintain the social aspects of the internship program. And so it'll be interesting to see how well it goes this year, but we're hoping that we'll get a student and be able to move forward with them on that.

OBY: That's fantastic. And I think throughout this whole conversation, you really highlighted the importance of mentorship. And I just want to ask what-- in your opinion, why is it so important to have mentorship in a clinical and translational research career? It sounds very much like it's a critical component of it, and I just wanted to know your perspective on why it's so important.

ALEXANDER PETER LIN: Absolutely. I think, especially for a lot of the VRIP students that have come from the program, they may not necessarily have thought about a career in research. And you're already busy as it is as a medical student, so to have them have this experience, I think, is really important to show them why research is important and, of course, to try to encourage them to go on to do that. And we've seen that.

I think we've had a number of different students that have come through our program. Mohammed Mohammed, Matt Enrique, [? Amelie ?] [? Conchal, ?] Abraham Isaac, they were all part of the VRIP program. They were all medical students, and they've gone on to do great things. Some of them-- obviously they all continue in their line of medicine. Mohammed Mohammed, for example, is an ER doc now at Stony Brook.

But you start seeing-- we do see them start doing some-- a lot of great research experience. Like Walker Keenan was a student in the SCTRP program, went to UCSF for medical school, and then eventually to Yale now for his-- he's a resident in psychiatry. And all through that process, you can see how he has done research in various groups.

Matt Enrique was at Albert Einstein, and he was had a special elective because we actually ended up in 2017 coming back-- he was initially in the program 2015-- to do some additional research with us. And it's great to encourage that kind of interaction and allow them to continue to do research, and we always encourage that. And we have another-- [? Amelie ?] [? Conchal ?] more recently in 2017, where she continued to work with us and end up getting a publication out of it. [INAUDIBLE] first authorship in ice hockey concussion. And so it is really great to be able to continue these relationships and hopefully encourage them to do research and see why it's important in their own clinical career to be able to translate a lot of this kind of knowledge into clinical practice. Obviously, they're the best person-- people to do that kind of work.

OBY: Right. That's fantastic. Well, thank you, Dr. Lin, for joining us again. It is always a pleasure to speak with you.

ALEXANDER PETER LIN: Thank you.

OBY: And we hope you stay well through this time.

ALEXANDER PETER LIN: You too as well. Thank you very much.

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OBY: To learn more about the guests on this episode, visit our website Catalyst.Harvard.edu/ThinkResearch.

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