

Kris Pahuja @ Piramidal (Edited)

[00:00:00] **Rob:** So you're saying, um, they, they start by, um, you know, looking at a researcher, reading all the papers and something interesting comes up.

[00:00:08] **Kris:** Uh, but I think, yeah, going back to it, it comes down to reading these papers, figuring out what can be productionized, how do you write production level code, but also having some sort of business sense of how to take it to the market.

Um, and I think that's just how a lot of these deep tech companies are born is. Can you ingest those papers, understand how to read them, um, and try to build something off it? Um, so in India, the AI trend, for example, is very big on, um, using, um, language models to create small little applications on other things.

But there is no foundation model coming out of India, which is surprising, or not that I've heard of. Um, but you know, here now, like building language models is all like it's moving so fast. It's kind of a thing of the past, right? It's like, well, that was like last year, like this year, you need to build your own foundation models from other modalities that are not, um, language because that's kind of done.

So I think, yeah, those are some, you know, some ways to attack the, um, deep tech space in general. Um,

[00:01:21] **Rob:** how would you advise, like, let's say a, um, uh, a final year or even like a second year, um, uh, software engineering students, um, in India who, you know, it's really smart, reads maybe like 20 books a year, applies this stuff.

Um, but. You know, at that stage, they probably haven't had that exposure to like, Oh, this is how you actually go like review all the academic literature. So the best thing that I came up with was, um, I've been just trying to learn this stuff myself, but I'm just like, okay, well, like I found like the, you know, the The Like a 16 Z like AI cannon and a bunch of other like AI research, just the popular like Andrew and G ones or whatever, a bunch of textbooks.

And I was like, okay, I'll read all this stuff. And then I should be at a level where I can read at least like the review articles, um, before then going into like the, the actual in depth research. Um, would that be generally how you would, so I guess what I'm asking is like, how would you self study it? If like scratch or from like first year computer science student, like knowledge.

[00:02:26] **Kris:** Yeah, that's a really good question. Um, it's a tricky question. I'll see. I can talk about my journey and it's similar to yours. So, um, I think step one is to find a niche, right? That you're really interested in. Like for me, it was neuroscience and I started reading everything about neuroscience. Um, and you're and especially neuroscience and AI.

Like I was super into it. So I was reading all the general stuff that was out there, like, because these are easier to understand. And like by all the different accelerators, YC has a lot of internal things that we're putting out. Um, Google has a lot of cool internal white papers on neuroscience. Um, started writing some of my own, uh, on neuroscience as well.

And then, you know, kind of just naturally Um, fell into, like, engineers and AI scientists, um, sharing like this is a new white paper that came on. You should read it. Um, started, you know, with the smaller summaries and try to like I mean, it takes a long time to read. You know, even if you're like you read like 20 papers, you would still feel like You know, it's it's, it's never easy, right?

So you want to go section by section. You want to be, I'm going to tackle the section, fully understand if you read it a few times, you kind of get it. And now with open AI, to be honest, I like often just copy paste like a paragraph and open it up to give me a summary, chat, GPT, and then go into the depths of it.

And I really leverage chat GPT to understand what's going on. Um, and then go section by section. And that's how I started getting into foundation models, different kinds of foundation model. My co founder. Was written a few papers himself, but you know, like, uh, especially Nature Scientific is super good for the best of the best papers that come out.

Um, so I constantly like following along as, as to what's happening there. Um, and yeah, kind of use Chat GPT and keep up, stay up.

[00:04:24] **Rob:** Did you have to, um. Did you have to learn, like, the, just foundational biology, um, or, you know, like, I don't know, like, for the neuroscience stuff, like, I don't know, did you, like, go through all biology on Khan Academy, or, like, buy all the first and second year biology textbooks, or did you kind of just go straight to the review articles and be like, okay, I don't understand something, let's, like, ask ChatGPT, and then, like, You know, fill in backwards.

[00:04:51] **Kris:** Yeah, no, I did. Um, so I spent about not much, three to four months. Um, so I, I knew I wanted to work with brain waves. I found brain waves fascinating for a long time. Um, my co founders. been writing papers on this for 10 years. So he knew everything about it. Um, so I knew what my niche was, right? It wasn't the brain in general.

Um, it was more like brain applications using EEG. Um, so I learned everything about it that I possibly could. Um, like, you know, I, I did buy a few books on it. Um, and that were advised by our advisors, like some of the top epileptologists. Um, and you know, a lot of these books, I mean, you start with easy for dummies kind of books, and then you like, go, uh, build up from there.

And then I expanded to, okay, well, what's this easy, then what's an MRI, you know, what's a CT scan, what's an ultrasound. So it was like, but all adjacent things, like I didn't go in general, like into everything to do with the brain or what are the different levels of the brain, it was more. What is my subject matter expertise I need and then what are the adjacent things around it that I need to know?

[00:06:05] **Rob:** Yeah, so you didn't really go all the way back to okay Let's just learn all of like first year second year biology and then like go into neuroscience and you're just like I'm interested in like EEG for Like, uh, you know, like neuroscience, how did you come to that, um, uh, problem area or interest area?

Cause I could imagine, you know, there's like thousands, millions of like interesting things in, uh, in like biotech, uh, that, that, you know, people could potentially work on.

[00:06:37] **Kris:** Yeah. Um, so at Google at the Google, uh, moonshot factory for Google X, uh, where they work on like weird things. Um, there was a cool project of it spun out into a company called next sense.

Um, but they were building easy earphones. Where, like, you can listen to music, but it also can track EEG of your brain via the earphones. Um, and then I was just talking to some engineers and, you know, like, where the applications can be crazy to the point where right now neuroscience is one of the few fields that is subjective.

Like, you go for mental health, you go for ADHD, you fill out a little form, they track your eye movement, but it's all subjective. It's on the doctor's discretion. Um, all the way to when you have brain surgery, like which part of the brain to operate on. It's all subjective. How do you make it measurable?

That was their whole thing. Like if I'm working, I should know what my optimal level of focus is. Um, if I'm sleeping, I need to know when my brain was fully in resting state. Um, and that's how, that's what I got really interested in. Like if you work out, you should know how it impacts your brain. People say it's really good for mental health, but I want to like, no.

What is that percentage work? Uh, how does my brain show in terms of performance? Um, so I just got really interested in that. And then that's how we started. But then realized that obviously that's too far in the future. Uh, and the way to get started is in the hospitals and in, in research facilities and drug discovery.

Um, so that's where we're starting. Um,

[00:08:11] **Rob:** How did you come across the problem of, um, you know, let's say during like brain surgery, um, there's no like, uh,

objective measure of is your brain doing okay. It's just like, Oh, Hey, you're awake. You're responding.

[00:08:24] **Kris:** Yeah. So, so then I met my co founder, uh, Dimitri. Um, who, you know, I mean, he did his PhD in hospitals.

So I was looking for something specific. Someone in neuroscience came across him, um, through mutual friends. And he was basically, um, like, I know everything about this problem. You're exactly right. I've been working on EEG for this many years. Um, and yeah, I mean, so it was a lot of like,

[00:08:54] **Rob:** And so did that come after you kind of studied, like, About this sort of EEG stuff and you're like, Hey, this is really fascinating.

And now, um, I'm going to go through my network to find, um, you know, like, like a researcher, uh, like a seasoned, um, like sort of chief science type of guy in, in the space.

[00:09:13] **Kris:** It was a mix of both. Um, I did a few interviews. Like I talked to neurologists, like classic, you know, a fascinating problem. Let me go talk to as many people as I can talk to a bunch of them and heard kind of similar stuff.

So I'm like, okay, well, let me go. Deep into this. If you confirm that and went to him and went into the weeds of why it's like that. Um, and yeah, so, but it was a lot of pre interviewing before, uh,

[00:09:41] **Rob:** Sort of rewinding a bit, um, because you mentioned, um, the, the, one of the first things that sort of caught your interest about the space was like the Google X, uh, project with like the ear, um, stuff.

Um, I guess, like, uh, one thing I've been kind of blogging about in terms of like a way to get ideas is or to, you know, build up expertise in a particular space. Um, Is just like study a hundred companies in whatever like space or industry that you're passionate about. Um, and then Uh, you know, and then I I guess like look at okay Well, what research papers do they affect because I I guess

when I was thinking about myself I was like, all right, just go into the research space.

I don't know what could be commercializable and what could it be? Um, did you take like a similar kind of path where you're like, okay, let's just study every single like AEG, um, like neuroscience startup and see, you know, where the gaps are and, and, uh, you know, if we can put all the best parts together or like, see what ideas that like triggers

[00:10:48] **Kris:** kind of, um, kind of, but the difference was that, um, you know, so AI and foundation models are so new, right?

So no one is really doing it. Um, or there's no like easy, especially I feel like it's, it's, it's so outdated. All the easy startups were, um, So we studied all the AG startups, which was good to know that they were very outdated. So the thing we learned was, okay, the A. I. N. E. G. Startups is like not really a I.

It's just some group based machine learning algorithm from like 10 years ago. Um, and you know, there's just don't perform as well. No one uses them. Um, so that was good validation. So it was more from the papers like, you know, picking like, Okay, well, neuroscience is interesting. Google's doing some cool stuff.

Uh, let's read on what's happening in the papers like what's happening in the labs. Like, is this something we can take out of the lab? Yeah. Um, that's how I went about it. Instead of studying startups, I actually studied a lot of work in the different labs.

[00:11:44] **Rob:** How, how, um, how could you gauge like, uh, You know, how commercializable is this?

Um, and then I guess what was the, um, like, how did you make the link between like, Oh, these are, you know, I guess there's probably a bunch of steps, right? There's like, okay, there's all this cool tech, uh, is it commercializable? But also like, how would, how did you make the link to like, Oh, um, we're gonna link it to like building a foundational model for like your, your brainwaves, um, to be able to,

you know, like, um, crack, um, Yeah, like like health outcomes and other things.

[00:12:24] **Kris:** Yeah, that's a great question. I think it was just really, uh, I mean, for one, having an understanding of how language foundation models work and it's like, well, why can't this be applied to this thing? And then papers kept coming out like back to back. So it was a positive signal. Um, Of like, okay, there's in one paper.

There's another paper. There's another paper. They're all slightly improving on each other. And then the missing link was it was in the lab, so they didn't have enough money to burn on compute. Because to train an EEG model, you need, like, a few million dollars of compute cost for it to really, you know, Be very good.

Same with language models, right? Like I mean, opening IQ is burning money on text and the more text that turn on the models keep getting better. Um, so we were like, well, these are getting to the basic outcomes and we know, and they're using open source data and there's Depending on 100, 000 and compute.

Can we spend more? Talk to my co founder was an AI scientist himself. Um, confirm those things. Um, see, I mean, you know, just reading the papers, you kind of get a sense of what direction they're going in. And if it's possible, how much money did they get in grants to do this? Um, and then you can well, it was only 100 grand to get to this point.

If you can raise 5 million, 6 million, you can really take it far.

[00:13:40] **Rob:** That that makes sense because yeah, so you mentioned though there were some like like rules engine based things and then they're like This is AI and then you're like, yeah, there's not Like make it AI. Oh, yeah, that makes sense. Um, so so going back to So, so you, you, um, you know, you, you, uh, you, you mentioned the, the, the, the, um, company out like Google X and, and the, the, the headphones and you're like, okay, like brainwaves are like, interesting.

Um, how did you then go about like reading papers? Like what, what was your process and what did you find? Like, I guess the most efficient way to navigate that landscape, um, without, you know, like brain implosion.

[00:14:23] **Kris:** Yeah. Yeah. That's it. I mean, you know, the one thing is I was reading papers. For my job at Google anyway, because I was working on the Gemini integration into Chrome.

Um, and so this is part of the role like I think and I was a product lead. So part of the role was, um, kind of be up to date with what's happening in the lab for language models. Because back then, language models were super new, like, you know, GPT 3 had just come out and it was the biggest deal ever. Um, you know, working, I mean, also GPT came out of a, like, same lab that this EG project came out of, which is interesting.

Um, and then, so I was just reading it anyway, but the way I would always go about it is, again, leverage, like, chat GPT and, you know, Put a bunch of stuff in there, read the summaries through chat GPT, be like, well, this is worth it. This is not worth it. And, you know, have GPT helped me with, um, a bunch of things like, what is the factor rating of this?

Like, is it, you know, is it high value? Is it, um, is it quoted by other people? Like how much has this been shared? And then, okay, this is the right paper to read. Let's do

[00:15:29] **Rob:** that. Would you start with the review articles or would you just go straight to like, I don't know, like the top 10, like more cited, like, like research papers?

Um,

[00:15:42] **Kris:** it depends. A lot of times, you know, in the neuroscience I got, I became a part of a bunch of neuroscience groups and, you know, these neuroscience and AI, um, communities, and I would just read what was circulating in them. And there's these like slack channels where we will be like, okay, this is a new one.

Super interesting. And what people are talking about, or, um, so it could be either. It just depends on what's, you know, Yep.

[00:16:12] **Rob:** Yep. Yep. Um, sorry. So you, you mentioned there were like chat groups and stuff and it was just like, well, what are people talking about is like good to read. So there's

[00:16:21] **Kris:** like, so there's this thing called Braingels.

Um, it's, it's a very prominent angel investing group of, uh, Um, and then we have like a bunch of like neuroscience people who have like built and sold, um, you know, like, like the control lab, the founders of control labs are in it. The founder of inflection AI is in it. Um, so these guys are like scouting for the next big startup.

They'll be like, Oh, someone was building this or, you know, this is super interesting. This could be commercialized. So it was just a lot of trend coming from there. And because we were part of rangels, uh, early on. And then,

[00:16:57] **Rob:** uh, so just like brain, Joel's like, like, yeah, brain. Yeah. Yeah, that.

[00:17:04] **Kris:** And then, uh, again, this, you know, this, like the highly cited review articles are coming from the more prominent neuroscience labs are obviously, or, or academic papers are the ones to focus on in general.

Um, and, you know, I feel like one, it's the way the internet algorithms work in general is once you're, you know, It finds out you're in the neuroscience community. It's like reading news, right? You will find out what the next paper is. You'll see it on LinkedIn. You'll see it somewhere else. Um, like I feel like all the prominent papers have come my way somewhere or the other without actually going out there and looking for them anymore.

It's Almost as if like I find out about a war happening somewhere and I would, it's going to come my way one way or another. It's like a similar way. Cool.

[00:17:48] **Rob:** Yeah. No, great. Great chatting, man. Um, really appreciate it.

[00:17:51] **Kris:** Yeah. Likewise. Uh, really nice to meet you both. And, um, yeah, I'm happy to see you in charge.

[00:17:57] **Rob:** All right.