**Transcript**

July 18, 2025, 4:03PM

 **Todd Helmus** 0:08  
What methods?  
What methods are you all applying in the statisticians realm and then thinking through how AI might be helpful to that?  
So if you guys can walk me through, maybe also as you maybe we'll do a quick introductions as we go along with this.  
As as you sort of offer your insights, do a quick introduction.  
But if you can also, as you're doing introductions, talk through what methods you guys do.  
What do you guys do?  
For a day job, and what methods are you applying to that over?  
Maybe we'll start with you, Brandon.

 **Brandon De Bruhl** 0:45  
OK, sounds good.  
First of all I am.  
I'm actually free for the whole hour.  
I thought this was an hour, so if we need if I need to go over I can tail end on stuff too.

 **Todd Helmus** 0:50  
OK, perfect.

 **Brandon De Bruhl** 0:56  
Alright, so my name is Brandon Brroll.  
I think I've actually seen everybody, at least virtually once, once or twice in my tenure at ran here.  
I've here about 4 1/2 years now, which is kind of feels like a long time, but isn't for rant right? So.  
My background is I'm completing APHD in public policy and economics.  
At USC.  
But I'm also working part time as a senior technical analyst for Rand, where I deploy lots of what I would consider machine learning and sort of LLM based methodologies as well as more traditional causal methodology.  
So I do a lot of causal work as well, and integrating a combination of what we call AI.  
But I would call machine learning into some of the causal estimators that we might otherwise use for like policy implementation or things like that.  
Most of my work area is in national security tech policy.  
I did a bunch of stuff for task, but actually the bulk of my work happens in NSRD, sometimes in HOAC and then in Arroyo and pass. So like, that's where I live most of the time, which is a weird place to live at the moment.  
So, especially from an analysis standpoint, like I have thoughts on.  
And I also have formal training as an economist as my undergrad and master's degrees, so.  
Like just so I think of.  
How I use this tool and this is just like an opening salvo.  
So like, it's not specific enough, but probably to be helpful, but.  
I often have been building what I would say is AI suites on top of traditional methodological expectations.  
So 1 aspect of this is that we have clients who demand things that use AI, and they're not always sure that that they know they want AI, but they don't actually have a methodological need for AI.  
'Cause like sometimes I'll just say, well, I did an AI thing, but I also did this.  
You know, regression analysis and it got you basically the same answer. And so the regression was probably just good enough and you could have gotten it.  
But I do both so that they feel good about it, right?  
So there's like sort of this demand for AI happening. And then there's this other component, which is there are actually like sort of very difficult NP problems that exist where we can then deploy sort of advanced methodological tools to try to go and answer those.  
And then the third category, the third bucket, and then I'll stop talking is about building tools that then give them the choice to generate outputs that they can use either in a decision process and implementation process or.  
A part evaluation process and so those types of tools that I've generated often times are much less sophisticated than I'd like them to be.  
But that's that's sort of like an overview.

 **Todd Helmus** 3:43  
OK.  
Thanks, Brandon. Jonathan.

 **Jonathan Cantor** 3:47  
Hi I am not a statistician just for the record I'm a health policy researcher at Rand.

 **Todd Helmus** 3:52  
No.

 **Jonathan Cantor** 3:53  
I've been here for about eight years.  
I hope that's OK still.

 **Todd Helmus** 3:56  
Sure.

 **Jonathan Cantor** 3:57  
Yeah. And so a lot of the work that we've been doing, at least with ML or AI based approaches has been trying to use ML or large language models to try and help with entity resolution.  
So I do a lot of work in healthcare mostly. And so with large data sets.  
That are not supposed to be harmonized in any way. We try to use.  
You know ML approaches or large language models to try and resolve and identify possible matches for linkages across data sets.  
So that's one of the main uses that we've been mostly focused on using that type, this type of tool.  
One of the challenges that I've been having is kind of like a lot of people are working on trying to do this type of work across different divisions.  
And groups and so there's no like single like rule making authority or suggestion in terms of like how to do this which would be super useful like if there was a Rand tool that did this.

 **Todd Helmus** 4:58  
What do you mean rule making authority?

 **Jonathan Cantor** 5:01  
Not like why?  
Like best practices.  
I know like CC is kind of been moving towards like having documentation of like what they think is like a good approach in terms of like taking specific analysis given like the structures of your data and like what the best practices are not like a Rand rule per.  
Southeast, but kind of like this is the like the type of like methodology that we use most recent and we think it's best, best in terms of like harmonizing.  
Messy datasets when linking them together.  
'Cause I think for the most part I've been working on the same sort of like issues like the last seven or so years in terms of like entity resolution and like the technology's definitely getting better, but it's not clear to me like what Rand perceives as like.  
Being the best ways of doing this type of work.  
And one other thing that I've been doing a lot of work on at least, is at least how LLM's respond to behavioral healthcare prompts.  
So we've had a couple of papers under review accepted on that.  
And a lot of limitations that we have is that we can only really have.  
Kind of coding or any sort of work with LLS that are kind of like static in the sense that like I prompt the LLM and see what it says as opposed to a more dynamic like conversation encoding how that works.  
So I'll stop there.  
Sorry, that's a lot.

 **Todd Helmus** 6:24  
OK.  
All right, well.  
Very interesting.  
Thank you, Andrew.

 **Andrew Morral** 6:29  
OK, I'm also not a statistician, but I think you know that, Todd.

 **Todd Helmus** 6:33  
Yeah.

 **Andrew Morral** 6:34  
I do a fair amount of statistical programming and and have been just wowed by cursor and and its integration of AI and and how much that has made programming faster and.  
More, more efficient and and more fun.  
So I I just think.  
I'm just amazed by how good it is.  
The statistical stuff I do is it's a lot of it in recent years has been.  
Different versions of small area estimation, which is a kind of which involves some prediction.  
And I use machine learning models usually.  
To do that prediction.  
And I do survey research and some of some people on my team have been using.  
ML tools for coding qualitative interviews.  
And have been reporting that as a positive experience.  
I'm not.  
I haven't seen very much of it yet, so I don't know.  
Yeah, I guess that's sort of an overview of where I where I'm where I'm coming from.  
I'm here.

 **Todd Helmus** 7:56  
Awesome. Thanks, Andrew. David.

 **David Klein** 8:00  
I'm a statistical analyst at Raymond, so that means a master's level statistician.  
And I've been here a really long time and I mostly work on healthcare studies and mostly supporting other people's research. So I'm not initiating my own research and I do a lot of regression analysis.  
From simple to complicated.  
And other, you know, data management, descriptive type of stuff, but most of the statistics I do is.  
Different types of regression.  
And I mostly use Sass and I write my own code.  
I've been pretty slow to get with the AI stuff and I feel like there's been very little part of the reason I want to join. This is, I feel like there's been very little guidance apart from the Reno Rams version of chat. I don't feel like like I.  
Never heard of cursor.  
No one's ever told me there's such a thing as cursor.  
I have used both brands chat.  
And.  
Another program called continue that's supposed to be more of a coding assistant to sometimes help when I'm doing something really complicated.  
I'm not sure what the right thing to do is, and that's been mixed.  
I usually almost always get the wrong answer from AI. It almost always gives me code that is doesn't exist is incorrect, but it often gives me code that is on the right path that I might not have figured out on my own.  
So it gives me the right procedure or the right.  
Set of options and then it turns out they use the wrong word.  
But that drove me to the right path, so I'm still trying to use AI to help, but I often end up wasting more time than I'm saving with for myself.

 **Todd Helmus** 9:42  
Yeah, well, it's interesting.  
It's interesting you know about, you know, just discovering cursor like I like.  
I'm doing this project and I'm I'm discovering new tools every day.  
Like now I realize I have to go find a deep access to.  
Claude deep research tool. In order to tell me what my report should say.  
For that, we're doing on on on Africa, right.  
So there's a lot of tools out there and.  
I'm just learning some of these things myself, so very interesting.  
Curious to get your guys thoughts so with a lot of different work that you're doing.  
Notebook LM.  
Go ahead, Brandon.

 **Brandon De Bruhl** 10:28  
Oh, I just.  
I just would like that's a really useful tool for streamlining architect architected like structured textual data for extracting insights, is actually better than the one that you mentioned. Just so you know.

 **Todd Helmus** 10:41  
Notebook LM.

 **Brandon De Bruhl** 10:43  
For Google, so like I have accessed its API 'cause I'm a Google developer person and so and I used to work at Google and so like I had pulled a bunch of their stuff that they gave out and have used it to like concatenate Rand reports quite quickly.  
Just as test like publicly available stuff.  
Nothing, you know, crazy, but like, you know, that's the part of the problem is that there's too many tools too often and there's no.  
Like you just gotta.  
It's it's sort of like either you don't know it or you don't and that's.  
And that is like I I have the same problem. I was in a meeting yesterday and I found out another tool that existed and I was like, OK, like, how am I gonna work?  
Like I already have a workflow that's complicated enough.  
Like why do I wanna add another thing?  
But you know, and some of it's just.

 **Todd Helmus** 11:27  
And it takes time to learn each of these.

 **Brandon De Bruhl** 11:29  
Yeah, exactly.

 **Andrew Morral** 11:31  
Notebook LM I I think I haven't used them myself, but it's something that I imagine would be extremely useful to many people at Rand.

 **Brandon De Bruhl** 11:31  
Yeah.

 **Andrew Morral** 11:40  
B.  
You know, I've. I've heard people talk about how they use it.  
You know, they they do like a lit search and and put in 60 papers that they've collected into the into that notebook LM and then it just becomes sort of an expert system on those papers and and can answer your questions about those papers and can.  
You know, cite the papers and and bring you to what you're looking for in those papers.

 **Brandon De Bruhl** 12:08  
And just to piggyback on that briefly like how I learned about it was PRGS students, so and you know they're always looking for the edge. And when I'm teaching, I taught my LLM class and I didn't know about it.

 **Todd Helmus** 12:08  
Interesting.

 **Brandon De Bruhl** 12:19  
And so everybody was getting the right answer on everything.  
And I was like, hey, OK, I need someone to queue me in on why nobody got the right answer for the first half of the course and all of a sudden, everybody there was like a clear discontinuity here.  
So could you help me out?  
And then they finally disclosed that they had found this neat pool.  
And so that was really useful so.  
One thing is to, I would say.  
Aggressively interrogate the PRGS students about their tools 'cause they'll always be ahead of us, I think.  
The other thing is the Nice part about noble gleam.  
Is it is a closed system, so like it's not pulling from the Internet and it's trained locally so.  
Like it pulls its weights locally, even though it's generalized.  
So it's a foundation model, but then they generalize the weights locally so that you're only pulling from the set of literature that you fed it, so it will not go beyond that, which is a benefit and a cost. So just sorry about that.  
But just to build on Andrew's point.

 **Todd Helmus** 13:13  
Interesting.  
So I wanted to take a a quick so most of y'all are involved in doing some different forms of statistical analysis.  
So maybe that's a good place to quick start here and I'm just wondering on on that and it's been a long time since I've had my clinical psychology statistics class.  
But can you sort of walk me through the bowel rhythms of?  
The different ways to do those analysis and I get that there's different statistical tool sets out there, different statistical forms of analysis one could do.  
But maybe.  
Sort of more broadly than you know, applying one method, one type of.  
Statist statistics statistic technique versus another. Is there sort of a broad battle rhythm that goes into?  
To doing those types of analysis and what would that battle rhythm look like over?

 **Andrew Morral** 14:25  
Well, for me it's, you know, it's 90% data wrangling and trying to get the trying to get the data merged and formatted in a way that I can use it or I can visualize it or I can do statistical analysis on it and then running the mod.  
Can take a long time, but it's not my time.  
It's it's computer time.

 **Todd Helmus** 14:45  
Yep.

 **Brandon De Bruhl** 14:49  
I'm I I don't know.  
I'm often leading teams that are doing the actual work, so like I will hire people from RPG or I'll bring people from stats groups like I've worked with Gabe quite a bit on some cool Bayesian stuff.  
And so like for me, the battle rhythms are much more about thinking strategically about deploying toolkits and trying to satisfy client needs more. Just different toolkits like there's just so many like. I kind of think of it like arrows and quivers, right.

 **Todd Helmus** 15:14  
What toolkits?

 **Brandon De Bruhl** 15:20  
So like I I've been playing a lot of bowlers Gate 3 lately.  
So like my thinking is around like how many spells do I have in my spell book, or how many arrows do I have in my quiver or whatever? You know it's like.  
Like whatever the tool like you have to have an adaptive set of toolkits cause 'cause almost always the client demands are very very different.  
Like I've never walked into the same meeting and say, oh, I can. I can find you that bespoke, that non bespoke toolkit to give you and you'll be great.  
It's always very customized is what what they want.

 **David Klein** 15:57  
I work.

 **Todd Helmus** 15:57  
Yeah.

 **David Klein** 15:59  
It's sort of like what Andrew said.  
I start off when I'm starting out a project. I usually have to kind of put together the data and the code book and figure out how to make a useful analytic data set out of it. And usually deriving variables.  
I work with.  
And most of what I work is a sort of behavioral health.  
So there's always these scales that have to be derived, and taking means of various things and so on.  
And then I'm usually working with a.  
PhD, who has a theory behind it. So they're directing.  
What? What hypothesis they have?  
And then I'm translating that hypothesis into physical analysis.  
And so I'll. I'll usually run with or without a pH. D statistician in helping run the models.  
And then sort of produce the output in either either share the output or make tables and sort of explain the results to the Pi.

 **Todd Helmus** 16:53  
Raja.

 **David Klein** 16:53  
And then we usually iterate.

 **Andrew Morral** 16:55  
I think I kind of I I sort of undersold how much work is involved in building the model 'cause. It is sort of an iterative process and there's there's checking that you do along the way. And and sometimes you start with a simple model and and build up.

 **Todd Helmus** 16:56  
So.

 **Andrew Morral** 17:11  
To the model you think you need.

 **Jonathan Cantor** 17:18  
Yeah, I mostly do a lot of work.  
Well, a mix of either a lot of data wrangling or increasingly tried to shift that all over to other programmers.  
And then I try to come up with like, some specific type of analysis plan type document that walks through what the goal is and then try to estimate like regression models.  
Now it can either be like small in scale or it could be like billions of observations.  
It could be either one.  
But.  
I tried.  
I don't really like pivot very much in terms of like the underlying estimation because my models don't get overly different from task to task, so you're able to leverage a lot of the previous code for current code.  
So I try not to like stray too far from what I've done in the past.

 **Todd Helmus** 18:06  
Mm-hmm.

 **Brandon De Bruhl** 18:08  
Can I ask a question?  
Is it OK, Todd?

 **Todd Helmus** 18:10  
Yeah.

 **Brandon De Bruhl** 18:11  
Just of the group, generally because I I've seen this before, so do you.  
Do you see your code or your your, your, your battle process supporting an institutional client or a single set of clients that are very, very similar things? And are you sort of selecting by project to work on those or do you see that when the distribution of request?  
Come in that you're trying to answer that.  
The variance in those questions with the same tools like that's like that difference is what I'm I.  
Interested in trying to understand a little bit.

 **Jonathan Cantor** 18:45  
Ends really like it's whatever. I mean, if the client wants something, then you just modify yourself to what they want.  
But I feel like on the grand side or Pi side like you have a lot more flexibility and so you have a lot more opportunity to like just figure out what you think is gonna be most impactful. And given the constraints that Rand you try to do the.  
Thing that's gonna be able to get out quickest within the budget framework.  
Like the PPT, yeah.

 **David Klein** 19:13  
Yeah, I also mostly work on grants.  
So my for me, the client is really the Pi.  
You know, they're most of the grants I work on are NH grants.  
So they're obviously the client, but the Pi has a lot of freedom in designing the study, and so I end up doing methods that that Pi is most comfortable with.  
It's also, you know, we're the the first eventual goal is impact, but the first goal most primary goal is writing papers most of the time.  
And sometimes the old methods are better for that than thinking of something.  
Knew that reviewers are like, I don't understand what this is and you have to explain it all. And you know, reviewers know what progression means and they understand P values and stuff and so.  
It's not only the old methods work, but they're often better for getting published.

 **Jonathan Cantor** 19:57  
Say something on topic, OK?

 **Andrew Morral** 19:58  
We're no go ahead, Jonathan.

 **Jonathan Cantor** 20:00  
Yeah, I was just gonna say something off what David said.  
I found it particularly challenging at Rand to be able to like, go to someone who's like a statistician or methods based person and be like hey, here's 10 or 15 days come up with a new sort of method and like, write the paper up for it. And here.  
Research question, even within the NIH confines, I've not had any success with that. I think, Andrew, you probably have had more success with that than I have and it's particularly challenging to come up with like new any sort of like even statistical LLM based or any sort of.  
Like methodology paper here, even with offering like the PPT and like the research question, that's just my own personal experience.  
I don't know if others have had the same, sorry.

 **David Klein** 20:46  
What? What was the problem in those situations that statisticians didn't want to do it, or they couldn't? Or that the situation didn't?

 **Jonathan Cantor** 20:53  
I.  
I it's fractionation would be. My guess is that like lot not inability to have like the deep thought of trying to do something.  
I think my I've worked on the same paper for seven or eight years at this point with one person, just because like it, it just the PPT structure doesn't make it feasible for them to be able to, like, do the deep work to come up with a method.

 **David Klein** 21:16  
Mm-hmm.  
This new IRP is supposed to help with that.  
The that's supposed to be give you, but that's only five days too, which is still not that much time.

 **Jonathan Cantor** 21:24  
Yeah, yeah.

 **Todd Helmus** 21:28  
I'm just curious so.  
Where do you guys?  
Where do you all think AI can be helpful on, you know, staying on the statistical realm?  
Where has it been helpful?  
Where could it be?  
What aspects of it could be helpful?  
I mean in terms of, you know, the data wrangling is a long pole in the tent.  
How does how you know?  
Maybe focusing on that part of it before we get to the modeling.  
In what ways is is, is AI or could automation some form of automation be supportive of that?  
That over.

 **Brandon De Bruhl** 22:01  
I'm just gonna jump in here briefly, I think.  
22 points on this.  
One is a lot of AI tools in the computer science sort of realm are built around the concepts of data lakes, and I think Rand's a general organizational architecture is anathema to the concept of a data lake.  
So you have a well, you have. So first of all like, so I have a good friend who works at Palantir and he set up their data lake for the Pentagon.

 **Todd Helmus** 22:21  
How so?

 **Brandon De Bruhl** 22:30  
Like that was his job and it took them years just to even get people in the room and ran shares the same problem. It's like you have.  
I mean, and I'm gonna let others opin in this 'cause I think you guys even have have more actual stories than I do.  
But like the fragmentation across how we store data, we don't have a data we don't have like a a data process for like integrating data. We don't have standards when it comes to like actually building data toolkits and it gets really, really difficult to integrate and I know.  
Like.  
Folks at RPG have attempted to do.  
Several of these things, but it's just really challenging when we have 1000 cats in a bag, which is basically how I describe Rand half the time.

 **Todd Helmus** 23:10  
And that's important. And and those day lakes are important. To what end?  
To what aspect of this over?

 **Brandon De Bruhl** 23:15  
Well, well, the well, a lot of what we call so like Todd and I don't mean to like put you in a corner, but like what do you mean by AI is like a fundamental question that we haven't quite tackled, right?

 **Todd Helmus** 23:23  
Huh.

 **Brandon De Bruhl** 23:25  
And I'm and I don't know if there's an answer to this, frankly. But but like, if we're thinking of AI like foundation models like developing a foundation model or deploying machine learning, a lot of like like narrow machine learning can be deployed on small set data. It's very.  
Similar to the way like regression analysis is, but if we're talking about large scale pattern matching and predictions.  
Across a suite of complex data, probably similar to what Jonathan's doing, you're you really need a data lake, which is basically a huge unstructured array of data, right?  
I mean, Jonathan, go for it.  
I can see you.

 **Jonathan Cantor** 23:57  
But to that point I have actually tried to instill this on projects now, like I'm trying to do build my own data lake for a five year NIHR one where we're taking Rand specific data and doing best practices. The best of the best ways possible. It's extremely Exp.  
It's eating up a bunch of our budget, but like we're trying to do that.  
So Brandon, I mean, feel like I completely coast on everything you're saying that like doing.  
That's the way the future.  
And you know, I mean.  
It without, like NIH funding, I couldn't have done it.  
I don't think a contract would allow me to do something like that.

 **Brandon De Bruhl** 24:34  
Yeah, and and just to, Jonathan, I'm curious, just building on that point like.  
I am not aware of any AI tool that helps us build a data link other than maybe we could have translators who could, like unstructured data like it could aggregate reaggregate deaggregate but like those are pretty closely held by the people who develop them because that's how they.  
Make their money is my understanding so but.

 **Jonathan Cantor** 24:59  
Yeah.  
I think right now we've been mostly focused on trying to get the data scraped standardized and structured in a way that Rand houses it. So that can completely automate it on frequent spaces so that we can always then try to figure out other exactly what you're suggesting, so.

 **Brandon De Bruhl** 25:13  
Yeah.

 **Jonathan Cantor** 25:17  
I think it's mostly been trying to get the data together and then to move to that E that you're describing.

 **Brandon De Bruhl** 25:25  
I mean, yeah, I guess data, data pipelines, real issue like.

 **Jonathan Cantor** 25:28  
That's. Yeah, that's what we did.  
We yeah.

 **Brandon De Bruhl** 25:30  
Yeah.  
Yeah, like I don't.  
I mean that the problem with data pipelines, I think the solution is actually dollars, which is is not more tooled but more dollars.

 **Todd Helmus** 25:37  
And this is useful.  
Dumb it down for me a little bit.  
These I mean I get the notion of I understand the notion of data lakes, but how does this get connected to a workflow of a researcher over?

 **Brandon De Bruhl** 25:41  
Sure.  
Sure. I guess it really depends on like what you're thinking, but imagine you have a giant lake of like like a giant pool of data that has lots and lots of different interactions in it or lots and lots of variables. And then you, let's say you're trying to.  
Do I think health is an easier example than most is because health is pretty categoricalized and has good typologies and it's well studied and so you could like basically say something like well, if I'm trying to pattern match across drug manufacturing.  
I don't know outcomes and I have all of this great patient data in this giant data lake. I can start finding correlations simply by running pattern matching like by building a machine learning algorithm that will just crawl over that thing and brute force out outcomes, and then I.  
Can use that to start refining.  
More narrow analysis, so you sort of have a cone of analysis is the way I think about it.  
It's how I teach it in at PRGS.  
So if anybody has a better idea, let me know.  
But like it's like a cone.  
Like you start broad and you sort of data mine out through the lens.  
And then as you sort of gain insights, you refine and refine and refine until you get something that is actually a modelable product like so you can build a model out of it. In essence, that's my that's my how I sort of tackle that process when I'm think.  
About large data sets.

 **Jonathan Cantor** 27:06  
For us, it's more that we have like a continued project that like is a substantial need. We're trying to measure psychiatric bed capacity at throughout the United States. The federal government doesn't do it. And so we've had to standardize and harmonize data sets from every single state and.  
Take rant internal data sets and standardize them and combine them as well.  
And then make that automatable process. Refine Linking's over time, and then make it so that other Rand researchers and other researchers in general will.  
Directly from that data that we can learn from it and then reintegrate those findings into the data.  
So Brandon, that might.  
That's the terminology that I've been always used, yeah.

 **Todd Helmus** 27:45  
So basically you have all this data in different formats and you got to put that all together in one place and sort of a systematic format that.

 **David Klein** 27:46  
I.  
Said.

 **Todd Helmus** 27:54  
Machine learning and other tools can work off of.

 **Jonathan Cantor** 27:57  
Yeah. And then reintegrate it back up from stuff that you do learn because you'll acquire new data assets that you can push back.

 **Todd Helmus** 28:04  
Sort of. Data wrangling on steroids.

 **Brandon De Bruhl** 28:07  
Yeah.

 **David Klein** 28:08  
I have to go.  
I have another meeting at that's been going on, but there's been interesting and happy to join the next one. OK, bye.

 **Todd Helmus** 28:10  
Understood.  
Thanks Dave.  
Appreciate it.  
Right.

 **Brandon De Bruhl** 28:17  
Thank you.  
I mean, I mean, one point I would make is like one of the fundament underlying challenges with doing a lot of this real technical work is that a lot of data comes in already structured. And so part of the process of integrating it into the data lake is.  
Trying to destructure the data because sometimes what you're looking for is specific patterns in the the data themselves, rather than how they were collected.  
But there's always sort of data bias that exists.  
So you sort of have to sort of hand wave your way through some of that.  
But.  
But yeah, like like part of this is building large unstructured data sets.  
I think 40% of open A is budget is on that actually quite frankly.

 **Todd Helmus** 29:04  
So where do can you connect this to?  
To what Rand can or should invest in.

 **Brandon De Bruhl** 29:13  
I've been talking a lot, so I'll prefer.

 **Jonathan Cantor** 29:13  
Good.  
Oh yeah, Andrew, sorry.

 **Andrew Morral** 29:18  
I can't speak to the data lake thing 'cause I haven't done anything with it with that, but.  
But for AI and data wrangling like the the cursor tool I mentioned, it has been incredibly helpful for that.  
It's, you know it.  
It helps with programming, but it also, you know, increasingly I use these tools to learn more about methods I wasn't familiar with, and they're pretty good at queuing me into appropriate tools. Some of them sometimes I'm working with a model I'm not super.  
Familiar with.  
And and it's got lots and lots of tunable.  
Parameters and you know the AI is just terrific at helping.  
Me learn about those parameters or how to work with them or how to.  
You know.  
How to optimize the model?

 **Todd Helmus** 30:19  
Can you?  
Can you give an example?

 **Andrew Morral** 30:23  
I've been using a model called INLA.  
I'm not even sure what it stands for, but it's a.  
It's a Bayesian.  
Geospatial regression type model.  
And it has a million different parameters and.  
And it's sort of daunting to to try to learn. But but I've gotten really, really good products out of it.  
You know, verifiably good products.  
By working with AI to learn how to to use it.

 **Brandon De Bruhl** 31:03  
I I just want piggyback on this.  
So like I use cursor as well for a lot of stuff, I think that should be a ran standard.  
I mean, there's versions like. If you use get, get lab, you have a different one with VS code, but the cursor I find is particularly useful for lots of things, partly because there's a. It's sort of a conversation based code editor which has lots of. It's like I.  
Which has lots of interactions, and then I often like take things out of cursor and put it into.  
Other formats.  
I think that like.  
When you're dealing with small scale projects, AI is actually better and performs better than large scale projects is my guess.  
And that, or at least that's been my experience.

 **Todd Helmus** 31:42  
How so?

 **Brandon De Bruhl** 31:43  
Because it can handle the print like if you can clearly define your sort of goals and missions like I I did a project with Tim Bonds recently on looking at Telegraph data and there's only so many Telegraph poles in the world basically, right?  
And so we were trying to map a bunch of stuff in Ukraine, and we had a bunch of old data and we wanted to make inference about, like, where would data fall down.  
Like, where would we lose Poles versus where would we see gains in Poles?  
And so we made a predictive model.  
And it was really great.  
Like AI helped us build that predictive model.  
Extremely fast, like normally it would have taken 5-6 coders three or four weeks and a significant portion of the budget of this relatively small project. And we got it done in like 2 coders and six hours. So like our efficiency rating went up like 10X which?  
Is pretty amazing.  
Like, that's pretty awesome.  
But the more complex the project gets, the harder that becomes to, like, sort of broadly implement that I've learned.  
But then, you know, maybe the tools get more sophisticated as we go.

 **Todd Helmus** 32:50  
OK.  
So what about? I mean, and maybe you just covered this, but in terms of running the models themselves and doing the actual?  
So once you've sort of got the data wrangled and and then you start doing the analysis itself.  
Where where does AI come into that and what are the benefits?  
What are the risks?

 **Brandon De Bruhl** 33:12  
I find that I'm just gonna jump quickly in this 'cause. I think I find that often times, as I'm usually reviewing outputs more so than producing nowadays as a senior person, it just seems to be the shift in terms of cost structure.  
Like I spend a lot more time on double checking work.  
Like if if I hired Andrew and I said run a regression analysis and stat and hand me the output, I could look at that in 20 seconds and assess whether that is correctly done or not and I'm.  
Probably confident Andrew could like knock that other part within with his eyes closed, right?  
Having him run it in Python with an LLM assisted code generation, I have to get much more skeptical about what those outputs are.  
And so I spent a lot more time on QA ING before it even reaches QA.  
So like I run a separate code internal QA process on my team that that's mostly what I have been doing. Now that I have a bunch of code like I'll have fewer coders, but I'm often having them use AI tools. I'm now checking the AI's work.

 **Andrew Morral** 34:16  
Let me just jump in on that because I first of all totally agree with you. And but second of all, I think one of the one of the hidden benefits of cursor or things like that is that it's so easy to insert checks you know and and you.  
Know things that you you might not do if you were doing all your own coding, you know.  
Just periodic visualizations. Periodic you know checks for missing data, periodic range checks, things like that.  
You just tell it to put one in and it does it, and and it's so easy.

 **Brandon De Bruhl** 34:44  
Mm-hmm.

 **Andrew Morral** 34:46  
That I do more of it.

 **Todd Helmus** 34:50  
Hmm.

 **Brandon De Bruhl** 34:50  
Yep, that's true.  
Or I'll go in and I'll use.  
I've used cursor before or I've used the VS code version of it. The Git version of it, and I'll put them in 'cause. It's not always folks are as diligent as Andrew is, and so like, I'll throw them in there or I'll do a spot check and I.  
Have the LLM.  
I'll have some type of tool check the code itself or I'll Co run it or something like or I'll have it reproduce the code just to see if I get a variant that's more efficient or something, right?  
But things that like like Nice to have show up pretty easily like like I know this sounds stupid but like processing time bars and stuff like that used to be kind of a pain to put in your code.  
And you'd have to, you know, sort of know your stuff. Now I can just, like, throw them in there and it helps me sort of track what's happening a little bit more easily.

 **Andrew Morral** 35:38  
And regex.

 **Brandon De Bruhl** 35:40  
Oh yeah, red. Oh, yeah. Absolutely, yeah.

 **Todd Helmus** 35:42  
What's redjacks?

 **Andrew Morral** 35:44  
It's this incredibly fiddly way of handling text where it's not intuitive and you have to memorize like the dictionary before you can actually use it properly.  
But LLM's have memorized the dictionary, so it works.

 **Brandon De Bruhl** 35:58  
So you just tell what you want and it just does it instead of trying to be like, Oh my God, where did I put that thing?

 **Todd Helmus** 36:05  
Interesting. So what?  
So given all of this, if you can sort of talk through what, what do you think ran should be doing to make making your lives easier?

 **Andrew Morral** 36:16  
I wish I had a notebook LM available to me.  
I could pay for it.  
The and and I am paying for for cursor.  
But I agree it should be arans standard.

 **Brandon De Bruhl** 36:31  
I'm I'm paying for both.  
I.  
I pay.  
I actually I think I spent about 100 and my girlfriend was mad at me yesterday because she looked at our bills and I they like pay like $100 in AI tools.  
Because ran doesn't like about 100.

 **Andrew Morral** 36:41  
A month.

 **Brandon De Bruhl** 36:43  
Yeah, a month.  
I don't think ran provides us enough.  
Flexibility in that also we haven't talked about the high side, which I think is a significantly important part of this, but I don't maybe that's not this is not the place.

 **Todd Helmus** 36:56  
We can.  
We can talk about that, but tell me, like, what do you think ranch should be?  
What's the solution space then?  
There's all these different tools available.  
I guess it's not feasible. Ran could gain institutional subscriptions to all of the different tools available that that people use and different researchers being notoriously independent.  
Or likely to do their own thing off more often than not.  
Is there a way for ran to support that?  
I mean should be should ran be giving us a a $50?  
$75 subscription cost and support whatever tools we think we need.

 **Andrew Morral** 37:33  
An AI budget.

 **Brandon De Bruhl** 37:35  
Yep.

 **Todd Helmus** 37:35  
In a budget.

 **Jonathan Cantor** 37:37  
I actually.

 **Todd Helmus** 37:37  
You think that makes more sense than than than than than.  
Which what would you rather have? Like ram? Getting a subscription to cursor or you guys getting a A budget to get whatever you need?

 **Brandon De Bruhl** 37:51  
I think that just that, yeah, I'm budget and the reason why is because like Andrew and I might use cursor, but Jonathan might use GitLab because he prefers that.

 **Andrew Morral** 37:52  
I would like a budget.

 **Brandon De Bruhl** 38:01  
For whatever reason, I'm just, you know, throwing it out.  
I'm not trying to put a spot on you guys, but.

 **Jonathan Cantor** 38:05  
I just also just comment on the fact that like I thought I couldn't use any of these softwares on ran computers like I thought Ranchat was the only thing I was allowed to use.  
So like even just clearer definitions of what is allowed and what isn't allowed.  
Like I'd be happy to invest in a lot of these tools and use them.  
But like I don't know what's allowed in my ran computer.  
So like I've had like software on there that like was not supposed to be on there. And so like, I don't know what I'm allowed to have and.  
I'm a risk averse person by nature, so like I don't wanna install software.  
Or do something that like Rand is not gonna be happy with me using so like just even guidance would be useful.

 **Todd Helmus** 38:43  
Yeah.

 **Brandon De Bruhl** 38:46  
Yeah, I mean, I mean, there's sort of I think three things ran can do.  
One is knowledge diffusion.  
Sort of activities you know and and building space and time for people to have conversations like these. Like we already learned stuff from each other. Like I I think both Andrew and Jonathan and I and all learn something today and that like that's like important but like we.  
Don't. The way I'm. I'm just gonna say it and hopefully I won't get canned, but the.  
The fact is, is it ran right now we are just, we are super pressured.  
Plus, there's all this other stuff happening where everybody's, you know, we had riffs and people are really uncertain and there's all that other stuff going on where, like, I can't get my staff to focus half the time. They're so worried about other stuff. And so it's like.  
I like ever since the last six months, part of it is like, you know, no one. No one has space to have conversations about this stuff anymore. Like there used to be really, really people go. But now people don't go to things as much. And so like just.  
Building space for it and saying it's a valued and important part of the conversation.  
Being in is an important thing. So like knowledge, diffusion should be should be a priority.  
Second, I really like the idea of a stipend simply because it's really hard to assess what tools will be in the future, at least during this period of instability. Like, I don't know if you do it for a year, you do it for whatever but like, but like.  
Yeah. I mean, last year, if you had asked me this question, I'd have a different answer than cursor. So like.

 **Andrew Morral** 40:13  
Well, and and I think a stipend would also breed innovation.  
You know, different people will be trying different things and and and some things will work great and and then that'll, you know, other people will want to use them.

 **Jonathan Cantor** 40:27  
The grand does a good job of like supporting certain things that they view as being like important data structures and data streams like Android.  
I think a lot of work that you've been doing, like on the gun side, like could use a data lake for example, and like should use a data lake but like.

 **Andrew Morral** 40:42  
I want to.  
I want to learn more about that.

 **Jonathan Cantor** 40:43  
Like, yeah, like, I mean, but like, I'm spending 20% of my initial budget to do this, getting like the best people I know. It ran to do it. And then like, I'm putting a lot of the upfront costs. And I think like, but it's supposed to help.  
Brand downstream.  
Which is totally fine. But like I think you know, just having better indications from random how to create stuff like this.  
Why we should and then I think that would also facilitate collaborations across groups like there's an easy like linkage. Like if the data if we do have different data lakes it it does facilitate like easier collaborations and should bring down costs.

 **Andrew Morral** 41:12  
Hmm.

 **Jonathan Cantor** 41:22  
So like the fact that only a certain few number of people know what a data lake is like or can describe, it seems problematic to me given that like as data is going to increasingly become more unstructured, more complicated like ran needs to have like a better handle.  
On it, right?

 **Brandon De Bruhl** 41:39  
And and I'll just.  
I'll just opine on this slightly.  
It's like I'm not entirely sure. Ran should be in the business of building data lakes, but we should be in the business of understanding what it is and how an analysis toolkit can build off of it.

 **Jonathan Cantor** 41:49  
Yeah, yeah, yeah.

 **Brandon De Bruhl** 41:51  
Right. Like like. Yeah.

 **Andrew Morral** 41:51  
I kind of think I feel a little ambivalent about all the work Rand is doing to build LLM tools. You know, I think that there's been like efforts to build things like notebook LM internally at Rand.  
And on the plus side, I think it's giving people experience working with LLM's and that's probably a positive, but it's hard to imagine that the home grown tools are gonna compete with what's available.

 **Todd Helmus** 42:16  
And then you have to re up. You know if you update them constantly.  
To to stay competitive with the market.

 **Brandon De Bruhl** 42:24  
I I just don't think Rand like Ed, Ed guys and I had a conversation about two years ago when when things were really starting to heat up. And one of the things that he said was the future of Rand will be an LLM by which people will ask.  
Policy questions and they'll get outputs and I think that future does not exist actually like like I the more we've learned about LLM's, the less likely that future seems to be the case, because we've built those tools and.  
Nobody really wants to have a policy conversation with a computer like.  
In reality.  
In fact, the demand for analysis seems to be decreasing. The more we automate it.  
But people get more engaged with things that can't be automated.  
So like.  
There's sort of a philosophical question of how much should Rand be interested in deploying these tools, and for what purpose?  
There's like a larger strategic question that needs to be answered because I feel like we're spending a lot of time on smaller things that actually might be eroding our business case in some ways.

 **Andrew Morral** 43:22  
Hmm.

 **Jonathan Cantor** 43:24  
I think that the other piece is like the data part. We have like very good institutional knowledge here and we know how to use specific data sets, combine certain data sets and at least like when I've worked with outside collaborators, one of the things we're known for is.  
Being able to ingest and scrape data most people can't do that, especially researching organizations and like a tech firm like a lot of the work we're doing, like Google gave up on like they didn't want to do it. So like, there's no like not no reason for it.  
So I think Rand has like a really good opportunity.  
Of using a lot of like our unique ability.  
Least in like the scraping and data ingesting and outputting tools and enhancing that, especially with LLMS and like.  
Based like tools I guess.

 **Brandon De Bruhl** 44:07  
Just a just.

 **Jonathan Cantor** 44:07  
That's my yeah.

 **Brandon De Bruhl** 44:09  
Yeah. I mean, Jonathan's point is really, really good, which is Rand's glory is built on the the backs of dead companies, other projects, right?  
So like I can't tell you how many Palantir projects I've gotten where we we like, just hack the heck out of it and and made it better.  
Like we, we like tackled things and we've built analytic responses and we even created some unique tools that would live within their stuff.  
So we sort of like.  
They sort of have some stuff we were able to.  
Pull data from other places.  
Combine it with some other things. We had some institutional knowledge that like for example, we wouldn't have known where this Air Force database was, but because one of the Rand people created it 35 years ago, we knew where it was and nobody else knew where it was.  
In fact, in the Pentagon didn't even know it was. And so, like the institutional knowledge within the building, was already eroded.  
And so we have like a deep bench and so pulling that's part of what our value add is is we just know stuff.  
And so we can like combine that with some.  
You know, outside of the box thinking in some cool analysis and we often wow people with that.  
Like we've had luck with that even in the hardest of rooms.

 **Todd Helmus** 45:20  
Hmm.  
Brandon, you you, before you said you had three points.  
Your first was knowledge diffusing.  
A second one was a stipend.  
What was the third one?

 **Brandon De Bruhl** 45:31  
I think the third one is just thinking about strategic critical investments and like you know, my a lot of my work is actually in investing.  
Like how to think about investments for large government agencies or companies. And so I think one of the things is like when you're develop like we tell our clients when they're thinking about like well, how am I gonna invest a billion dollars into something and to get out.  
That I want.  
We should really have a road map and a strategic conversation about it at a high level that everybody buys into.  
And I don't who has to buy into this.  
But like, there really should be a. You know, I suspect it's probably not at our level.  
It's probably at a higher senior level where they have an actual idea of what.  
What is it that they want out of these tools?  
Is it better analysis?  
Is it better data management? Is it?  
You know, whatever.  
And I suspect, Todd, this is part of what you're trying to get at, right?  
But I think a an actual like strategy needs to be put out there.  
'Cause writing it down matters, I think.

 **Todd Helmus** 46:37  
Yes, and just a broad a broad approach as to how ran will go.  
Well, what are the goals and how will Rand do that? Not just now as part of a singular, discrete effort, but continually and ongoing?

 **Brandon De Bruhl** 46:46  
Right.  
And then to benchmark yourself against it, right?  
So like you put a strategy out there and let's say it doesn't work.  
Well, you now have a reference point to say, well, it didn't work from this and we can now diagnose why.  
Or maybe it succeeds wildly and we can say, wow, we really nailed it.  
But why did that happen? So then you can sort of dig into mechanisms and assess those things in a way that is like systematic to your point earlier.

 **Todd Helmus** 47:20  
Interesting.  
Jen just a couple minutes remaining guys.  
Thanks for sticking out. The extra 30 minutes that I didn't have scheduled.  
Just to go back when we talked before about.  
So.  
Tools and potential tools that could be helpful on on the statistics end of things.  
One is, you know, the the the the tools like cursor and was it wasn't GitHub, it was git.

 **Brandon De Bruhl** 47:51  
It's called copilot, GitHub copilot.

 **Todd Helmus** 47:53  
GitHub copilot, so those types of tools help on the coding side and that you know, maybe there's not an argument that Rand should invest and choose just one of those, but give researchers options to choose from because different researchers have different styles and different types of approaches that.  
They're used to any anything else, any other types of tools out there, or types that ran should invest in or cross pollinate.  
That help on the developing these sort of statistical models?  
Yes.

 **Brandon De Bruhl** 48:24  
11 not a tool, but an idea that I'm kind of curious about. Andrew's view of this specifically just because he's worked with lots of different data.  
One of the chief challenges that we run into, especially around data encoding is that things live in like SaaS via for example, or they'll live in a state, you know DLT file, and then you'll have to, like, convert. AI is really good at converting stuff around and so.  
Like investing in architecture.  
Don't tell Gary Briggs, I said this 'cause I might get in trouble, but investing in architecture to like.  
Build.  
Encoding different data sources.  
Maybe like really important for the future, like figuring out a way to train LLM's or or get an in house tool that can can like help us encode across datasets more effectively.  
I'm curious.  
What do you guys think you guys are hands on?  
Probably more than I am nowadays.

 **Jonathan Cantor** 49:26  
I feel like I've that every government database is pretty much like forced to do that, but I think like for the unstructured stuff like you do run into problems, especially if like you're trying to create your own data systems that like they don't have to be consistent across.  
I will say, though, that like at least for NIH and for like making things like publicly available, they have like strict guidelines.  
So a tool that can do that would be awesome like especially like because the reporting guidelines are increasing.  
As things are being commented more.  
Replicable. Or I guess like open source.  
If there's like a way I can ingest a data set and it just does all the documentation, the code booking all of that stuff that can just upload that would be a real win.

 **Brandon De Bruhl** 50:11  
That's a lot of hours of free up labor.

 **Jonathan Cantor** 50:13  
Yeah.

 **Todd Helmus** 50:15  
Hmm.

 **Jonathan Cantor** 50:16  
Toy.

 **Brandon De Bruhl** 50:16  
We have that same problem on the high side. Just gonna say it like I cannot tell you how many hours I spent sit there and creating a code book.  
It's horrible.

 **Jonathan Cantor** 50:25  
No.

 **Brandon De Bruhl** 50:29  
I will say that there's like a larger conversation needs to happen about the high side because there are a lot of tools that I mean, I just want to say like I don't know, maybe this is a separate conversation that has to happen in a different place, but.

 **Todd Helmus** 50:34  
Oh yeah, go ahead.

 **Brandon De Bruhl** 50:42  
Like there are a lot of tools that exist in the world, and there's a lot of tools on both sides of the fence, and they're not.  
There's nothing there's like. No, it's talking about a lack of strategy organization.  
Like there's no direction coming from the federal government on that.  
And there's no direction coming from anywhere on it, actually. I mean, right now you sort of have being created by vendor and it depends on like which vendor you buy into basically.  
And then we just don't have.

 **Todd Helmus** 51:11  
I I.  
Just I just.  
I lost my network connectivity as you were drafting that thought out, so if you could one more time.

 **Brandon De Bruhl** 51:20  
Oh sure, yeah. Basically, basically, it's becoming on the high side.  
It's really largely based on like vendor and who you're working with like, whether that's Palantir or Lidos or whoever you've sort of contracted as an agency. And then we as Rand, we don't have a vendor and so we rely on the sponsor to provide us access to their.  
Stuff, but what really happens is then you have analysts who are like, I don't know how to do that because this vendor has created this bespoke way of approaching this.  
AI tool and I was never involved in it.  
And then they're asking me to do something from it.  
So like we spend a lot of time relearning, and and sometimes just we just give up and we just build our own thing and we do it from scratch, which.

 **Todd Helmus** 51:59  
I mean, there's no AI tools on the high side.  
It ran right now, right, I mean.

 **Brandon De Bruhl** 52:03  
Correct. Almost none.  
I mean we've we've created some machine learning stuff like de Novo like using the math.  
Like pure math.

 **Todd Helmus** 52:13  
Yeah, I'm yeah.  
So it's like that's a whole.  
That's a whole nother ball of wax is thinking of of what capabilities you need to to invest in on the high side. And there they then there it has to be sort of either well ran created tools or tools that we seek a vendor to to to, to.

 **Andrew Morral** 52:21  
And you know.

 **Brandon De Bruhl** 52:21  
Right I I.

 **Andrew Morral** 52:24  
I.

 **Todd Helmus** 52:31  
Purchase.

 **Brandon De Bruhl** 52:32  
I would.  
I would talk to Rich Gervin just as a note on that. He he'll have thoughts.

 **Andrew Morral** 52:38  
I do.  
I do very little on the high side but but similarly you know a lot of the data that I have been able to access in the past is now getting moved into these protected data environments that where I have to use some contractors.

 **Todd Helmus** 52:38  
Yeah.

 **Andrew Morral** 52:55  
Very closed off system and and don't have access to the tools that I would like to have.  
I don't.  
That's a solvable problem for us, but it's a similar similar problem to this, also the.  
The US Census has these research data centers that have the exact same problem where you know a lot of the data we want to work with, we have to, you know, go there and use their systems to to do it. And and that really restricts what we can.

 **Brandon De Bruhl** 53:11  
Hmm.

 **Andrew Morral** 53:21  
Access and and use.

 **Brandon De Bruhl** 53:23  
I think not to mention they're they're pretty poorly like they don't have enough resourcing of those systems. Like I remember sitting there at A at a one of those, it was a Cornell or something and it was like it took three hours for them to load the data.

 **Andrew Morral** 53:30  
Thank you.

 **Brandon De Bruhl** 53:36  
Set on the computer that they provided.  
That was it.  
I just sat there and read a book.

 **Andrew Morral** 53:44  
And it's it.

 **Todd Helmus** 53:45  
Let me get some reading.

 **Andrew Morral** 53:45  
And it's weeks or months to get set up to go in there in the first place.

 **Brandon De Bruhl** 53:49  
That took me 7, seven months.

 **Todd Helmus** 53:55  
All right, gentlemen. Thank you.  
I really appreciate this.  
This was really helpful. Interestingly across, you know, done a bunch of these interviews so far.  
This is the first one to to suggest a a budget, a personal budget for researchers.

 **Andrew Morral** 54:08  
And I think that's the best idea we came up with.

 **Brandon De Bruhl** 54:10  
Yeah, I.

 **Todd Helmus** 54:10  
Yeah, I think that's really good.

 **Andrew Morral** 54:11  
I also, I also really like Jonathan's idea of of clearer guidance on what's acceptable.

 **Brandon De Bruhl** 54:16  
Yeah, yeah, that's that.  
Should we just sort of I I think we operate in a high risk environment over here where we're just like yellow.  
Hopefully I won't get fired and.

 **Andrew Morral** 54:24  
Yeah, that's that's my approach too.  
But Jonathan's cautious.

 **Jonathan Cantor** 54:29  
Well, yeah, I was reprimanded once because I had Dropbox on my computer and I was told that wasn't allowed.  
I was like, OK.

 **Andrew Morral** 54:36  
Who knew?

 **Jonathan Cantor** 54:37  
Yeah.

 **Brandon De Bruhl** 54:37  
Yeah, I didn't know.

 **Todd Helmus** 54:38  
You know, especially if you're working with CUI data or you know, real stuff that's particularly sensitive, not just like generic ran stuff, much less interviews and HSBC stuff. And what do you have permission to use and not use?

 **Jonathan Cantor** 54:41  
Yep.

 **Todd Helmus** 54:53  
It's interesting.  
So, OK, great.  
Thanks guys.  
I put the PTN in the in the comments.  
This has been really helpful.  
Hopefully we'll have a product that's shareable.  
I.  
I don't know.  
I I'll give it to Bill and he'll he'll tell me what to do with it, but hopefully it's something that's.  
Well, useful to him and then maybe.  
Broadly shareable.

 **Andrew Morral** 55:13  
When we get our budgets, we'll know it was it was worth our time.

 **Brandon De Bruhl** 55:17  
Yeah.  
Yes.

 **Todd Helmus** 55:22  
You can have five each other on that one so.

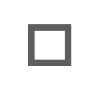
 **Brandon De Bruhl** 55:25  
Alright. Thank you, Tom. Appreciate it.

 **Andrew Morral** 55:26  
All right.

 **Todd Helmus** 55:27  
All right.  
Thanks guys.

 **Andrew Morral** 55:28  
Bye.

 **Brandon De Bruhl** 55:28  
Thank you guys. Bye.

 **Todd Helmus** stopped transcription