

# Actuaries Institute Podcast – Driven by Data: Gaining a coding edge

**Date:** 10 December 2021

**Interviewer:** Kriti Khullar

**Guest:** Marcello Negro, Ean Chan

**Duration:** 29:20

**Kriti Khullar:** Are you eager to see how your data mind stacks up against the very best in the analytics and modeling space? In recent years, actuaries have turned out in droves to take part in online data competitions to challenge themselves against unique set tasks to help grow their data analytics ability. I'm Kriti Khullar, member of the Actuaries Institute's Young Data Analytics Working Group, also known as YDAWG. Joining me today to discuss the highs, lows and key learnings from their competition experience are Marcello Negro and Ean Chan. Marcello is a principal at Finity Consulting and Ean is an actuarial manager at EY. Welcome to you both.

**Marcello Negro:** Thanks, Kriti. Thanks for having us.

**Ean Chan:** Hey Kriti, it's good to be here.

**Kriti Khullar:** Nice to have you guys here. Marcello this is your first time on the Institute's Podcast and to commence the discussion, could you please give a quick explanation of what a data competition is? What are some of the more popular competitions and do they have any rules?

**Marcello Negro:** Yeah. Thank You. Well, it's a topic that's near and dear to my heart. I've been doing these competitions for quite a few years now. So yeah, why don't I explain what we're actually talking about. The concept of a data competition is quite simple. They usually have an online platform and there's a few main ones out there, which we can go into in a moment and businesses kind of upload or define on these platforms, a business problem or something that they want to solve. Usually with data, they provide some context, they provide a data set it's usually de-identified and then they offer a reward, a prize for a good solution.

**Marcello Negro:** The problems themselves are usually prediction problems. 'Predict the chance of something happening' or 'predict some quantity' like how many sales are going to happen for this store in the next month and then anyone in the world can participate and challenge themselves to find the best solution and the best solution wins. That's the way that the programs are structured.

**Marcello Negro:** I found them as a really good way to solve, real world business problems outside of my domain of insurance and getting away from just tutorial data sets that we have at university and when we do courses externally. The platforms are quite simple and great to use.

**Kriti Khullar:** **Awesome. I might go into a little bit more detail, maybe with Ean first, what has your competition journey been like including the latest one you participated in?**

**Ean Chan:** Yeah, thanks Kriti. So, I think I've actually only submitted my answers to maybe three different competitions with the first one being probably about three years ago, I think and all of them have been financial services related for the actual submitted ones. The most recent one being the one earlier this year on actuarial loss prediction, hosted by the Actuaries Institute and others. What I've done a lot more of is read through other competitions and other people's code. If I see a particularly fun looking one, I'll play around with the feature engineering steps and the modeling steps, but not necessarily do it all end-to-end, to create a submission.

**Ean Chan:** What I actually use Kaggle for the most probably is the data sets. I like doing the exploratory data analysis. I like visualizations of the descriptive findings. I do enjoy doing the data analytics for prediction, but more skewed to an actual project or for work, not a competition necessarily, mainly because products will work, let you keep iterating. Sometimes coming back year on year. It lets you look for new data sources to fill gaps and the analysis is to gain actionable insights rather than just loss minimization, which you get from competitions. I think I've done, a couple of actual submissions, but I use Kaggle quite a lot.

**Kriti Khullar:** **Awesome. Thank you, Ean. Marcello, what about yourself? What has your competition journey been like?**

**Marcello Negro:** Yeah, well it's just before the competition journey, Ean just touched on the specific platform that he used there, which was Kaggle. It's worthwhile in just kind of explaining what that is for the listeners that don't know. So Kaggle is probably the most famous of these data science platforms it's been around for probably a decade now and if you're going to start with one, that'll be my recommendation go to that one, but there are others out there, definitely worthwhile Googling that. My personal favorite and the one I've been doing kind of more recently is a one called Numerai.

**Marcello Negro:** It's actually slightly different to Kaggle. It's essentially a stock price prediction competition. So, the platform gives all the participants, a weekly data set, and then the challenge or the problem that you've got to solve is basically predict which stocks are going to go up and down.

**Marcello Negro:** That's the competition and then you get rewarded if your predictions are accurate, and the way they determine whether it's accurate or not, or whether you make good predictions is that the platform itself takes everyone's predictions and ensembles or combines them together in their own model, their own meta model and then they actually run a hedge fund based on that. So, they're trading and I just looked up the stats for them. Their funds under management are massive. It's about \$50 million, but they're highly leveraged. So, there's I think a quarter of a billion dollars of good money being traded on the stock market in these hedge funds, purely based on the crowdsourced predictions from this competition platform, which I find kind of really fun. I've been doing that one every week and I know it takes a little bit of my time, but it's very fun. So many platforms out there and yeah, just find the one that's right for you.

**Marcello Negro:** So, my journey, so I did look up my Kaggle stats. So Ean, I did a few more competitions than you. My first one was seven years ago, and I've submitted a prediction in 26 competitions, but some of them were just like one submission just to kind of get my name on the board, but others, I spent quite a bit of time on depending on how much time I had available. So, you can do as, as little or as much as you want there and the latest one that I participated in outside of the Numerai hedge fund one, I just mentioned was the AI Crowd motor insurance market simulation, which I know was one that the Actuaries Institute was promoting kind of a couple months ago and I found that one really interesting as well.

**Kriti Khullar:** **Wow. It's really inspiring for myself. It doesn't matter how many competitions you've participated in, but exposure at least to the different types that are out there. So which makes me think, sorry.**

**Marcello Negro:** Yeah. I think that's the most important bit, to be honest, like the exposure and that's what I get from it. I know Ean, you were saying that you focus on the insurance ones and me too. I go to the ones that are useful for work and the things that I do, insurance or financial services focused probably with tabular data sets where it's a data structure that I can understand. I often, I don't know about you Ean, but I often don't do any of the ones about image classification or text prediction. I just find them a bit, a bit difficult, but I do read up about them and I find that actually quite valuable.

**Ean Chan:** Yeah. None of my actual submissions are for those kinds, but I do enjoy seeing what other people do and having little mockups of my own.

**Marcello Negro:** Yeah.

**Ean Chan:** I feel like when an insurance one comes up...

**Marcello Negro:** Yeah.

**Ean Chan:** ... I feel the need to represent a bit, like we need to... for the brand.

**Marcello Negro:** Yeah. That's right. For brand actuary.

**Kriti Khullar:** **Marcello, I might go back to for my next one, because it links in like sort of your motivation to join these competitions right at the start back seven years ago. What was it then? What is it now like, have you got gathered like a medal? What's the word sort of cabinet along the way as well, maybe a virtual one?**

**Marcello Negro:** Virtual trophy cabinet. I do, as I've only got one bronze medal from Kaggle out of 26 competitions, which I think is pretty poor showing, but I guess it's a reflection of how much time I spend on it. Probably not enough to compete at the gold level standard. On Kaggle you can kind of win medals if you place high on the leaderboard, if you models are kind of highly predictive or very predictive. Yeah. I've only won, one bronze medal to come in. I think it's the top 10% of the thing. So, I don't do it for the medals. Initially I did it purely for practice. I wanted to just improve my coding skills. I was doing a lot of that at work, wanted to learn more about new techniques. So that was the kind of first few years. The kind of next phase that I wanted to learn about was just get a bit more better intuition about feature engineering and creative ways to solve problems.

**Marcello Negro:** I think if you are on that data science and machine learning path in your career, you quickly find that it's not just about writing code. It's about kind of solving a problem kind of in creative ways. Now I unfortunately don't have as much time to, to spend on them. I actually use it now just to keep up to date with more recent research and what models people are using in practice. At work we didn't use to use that many neural networks and deep learning models, but we do now. And I kind of felt like I need to understand a bit more about those types of models and that's why I use Kaggle for that.

**Kriti Khullar:** **The curious actuary underway. So Ean, how about yourself? What's your motivation like at the start compared to now?**

**Ean Chan:** Yeah, I guess in the beginning, I first signed up because, wanted to learn data analysis, wanted to do some more coding and honestly, as an actuary I found out, I already knew data analysis to some extent and so it became more of an outlet to expand those skills and practice them along with yeah. Getting to do some coding and having a bit more fun with that. I think as for the medals, I think the competition I did best in didn't actually give out medals, unfortunately.

**Marcello Negro:** Me too.

**Ean Chan:** Yeah. Maybe we should skew our focus towards getting to flex those credentials later.

**Marcello Negro:** That's right. Do you remember what competition it was? Maybe it was the same one.

**Ean Chan:** I think my first one was actually the actuaries one.

**Marcello Negro:** Oh, okay.

**Ean Chan:** That I did earlier this year, but yeah, I think with the medals, because you can... Kaggle also has this like set progression, laid out for how to increase in the tiers or of contribution to discussions and competitions and all of that and I like the idea of this like set out progression with clear defined goals for each stage. But I think personally unstructured learning is the way I usually go about things and so the medal system along with the expansive amount of discussion means Kaggle is great for both really.

**Kriti Khullar:** **Ean, when you do sort of participate in these competitions, do you tend to interact with other participants?**

**Ean Chan:** Yeah. I personally haven't really interacted with the other participants much. I guess the main way I interact is by consuming their content, which is posts and comments on the discussion board for each competition or data set. And sometimes they've set up actuarial Jupyter notebooks and code, which again, dig into as well.

**Kriti Khullar:** **It's a social way of interacting these days. Marcello, how about for yourself? Do you normally interact with other participants?**

**Marcello Negro:** Yeah, pretty similar for me. I haven't actually participated in a team on Kaggle, a lot of people do that. I think it's actually would be a great way to kind of learn from other people. I just kind of haven't had the kind of time to do that. But similar to Ean, most of my interaction is actually, on the forum's kind of reading what other people are thinking and discussing and more and more of my time on Kaggle is actually just reading and thinking and less about writing code and I think that's something that I'd like listeners to think about as well. Like it doesn't have to be... You don't have to commit all this time to writing code and doing the competition, you can still learn quite a lot just by reading and looking at the forums.

**Kriti Khullar:** **Yeah. The thinking part is something that sometimes-doing BAU work when it becomes quite, I guess, voluminous, you do not take out as much time for, so these are our competitions do allow that opportunity to sort of sit back and step away a little bit. So.**

**Marcello Negro:** And discussing is good as well. Like I know when we were all back in the office, which seems like years ago. I used to love just talking about it with kind of other people.

- Marcello Negro:** I found this interesting cable competition, check out what these guys are doing, in terms of their modeling, maybe we could use it for Project X, for example. So yeah. Discussion is a valuable part of learning in my opinion.
- Ean Chan:** Yeah, I think so related to that point, actually, like I mentioned that I dig into just random data sets, which look interesting across Kaggle. The way I use them sometimes is to create Trivia questions, which I share with people at work and find a way to turn, I guess, data into games of some sort and I guess that's kind of interaction, maybe not so much with the participants of the competition but using Kaggle to talk about data.
- Kriti Khullar:** **Pretty awesome. Marcello like you might not be liaising with the participants, but do find like directly, but are you able to tell the diversity in the participants in terms of both professional backgrounds, age, gender?**
- Marcello Negro:** Yeah. Well, I actually think this is a problem with machine learning and the data science community at the moment in terms of diversity. So Kaggle actually do a survey of their participants every year and release the data and that actually upload the data on the platform and people then do analysis over the top of it and try to find interesting things. So, they are true to their word on that one. But the recent Kaggle survey came out, a participant survey and my reading of the exact summary, it's really not particularly diverse and that is an issue. So, 82% of data scientists that identified themselves on Kaggle were identified as male and only 16% female. So, it's really skew towards men. Then, the age mix is also kind of really going to centered around 25 to 29 year old's. So, it's just a lot in that kind of really specific age cohort and then the demographic.
- Marcello Negro:** The ethnicity and the nationality it's mainly U.S. and India. And India's been growing massively. So, in the last five years, it's gone from 10% of participants on cable to almost 25%. So really big growth there that said still 40% of participants on Kaggle are from other nationalities other than kind of U.S., India and the kind of the main ones who are Russia, France, UK, that kind of thing. So, I guess globally, it's quite diverse, but it's still relatively young males on there. So, I think it is an issue and like, I don't know how Kaggle are dealing with it, but it's something that I think as actuaries we should be aware of and try as best as we can to make sure that we're not being exclusionary in anything that we do as well.
- Kriti Khullar:** **Thank you for sharing that, what are some challenges participants can face Marcello during these competitions and perhaps any suggestions on how they can overcome it?**
- Marcello Negro:** Look, I think the hesitancy of people to participate in these challenges is it feels like there's a really high barrier to entry. Like you go onto these platforms and it's like, they're easy to sign up for, but then you click on a competition and it's like, okay, here's the data set.

**Marcello Negro:** It's four gigabytes (4GB) of data. And you know, this is the competition you need to participate in. These are the rules, these are the evaluation metric, all this kind of stuff. So, it seems really hard and you're staring at a blank piece of Python code or Python program. You're like, how do I, how do I even get started? So, while it does seem like a high barrier to entry, there are, I think some which is a challenge. I think there are some things that participants can do to get started easily.

**Marcello Negro:** My suggestions are look for a familiar domain. So, if there's an insurance or financial services type problem, start with that or if there's a particular sport that you're interested in and you know a lot about, and there's a problem about that sport on there. You can start with that. For me personally, I've started the smaller data sets, partly because I'm impatient and don't want to have to wait for my models to run for so long. But also, it's just a bit less confronting when you can just do with kind of, 10 or a 100-megabyte (100MB) data as opposed to gigabytes. And I kind of skew my experience towards the tabular data sets. So, none of this kind of initial classification modeling, at least initially it's just a bit harder. So, while there are some challenges, I think you can, you can just try something a bit easier.

**Marcello Negro:** Also, there's quite a lot of good material on Kaggle to help you get started. So, one thing I really like about the platform, and I don't know, before seeing it, but everyone's like really collaborative. Like they just upload their code and go, here's my solution. And they're coming pretty high up on the leaderboard and they're just giving away their answer.

**Marcello Negro:** Because they just, they care more about sharing, like their learnings than winning a prize so much so that sometimes the people that run the challenge conditions have to insist that people don't share their solutions. Cause it's kind of unfair if everyone just kind of see sees the answer.

**Marcello Negro:** Everyone shares their solutions and you can look at other people's code. You can copy it and modify it. So definitely some challenges. But if you're wanting to get started, there's quite easy parts to, to get started if you just take what other people have done and start from there.

**Kriti Khullar:** **Thanks Marcello. Ean what about for yourself? What are some challenges?**

**Ean Chan:** Yeah, I think expanding on what Marcello was saying. Yeah. These are all data nerds, ourselves included.

**Marcello Negro:** Yeah, exactly.

**Ean Chan:** Like they love to share.

**Marcello Negro:** Yeah.

**Ean Chan:** They love to show off a bit, right?

**Marcello Negro:** Yeah. Yeah.

**Ean Chan:** There's always that element and you can see that not just in these competitions, but like all across the internet, people are trying to teach, there's so many free resources out there on how to learn and I think that especially true in this like data analytics space. So, I think a hundred percent to what Marcello was saying, if you want to get started, Kaggle provides a way to... It hosts its own notebooks and kernels. So, you don't even have to set something up on your own side. Like if you just want to test a little bit of piping code, not even related to the competition and you've never set up something before you can just go into to Kaggle and use one of their notebook services, the point about other people sharing their entire submission Kaggle makes it easy. Like there's an option to literally copy someone's notebook right and just rename it as yours. Then you can start from there and then make changes if you want along the way. I think it sounds more daunting than it is to enter one of these competitions. And yeah, I think just crossing that barrier, you won't hit as many challenges as you think.

**Kriti Khullar:** **Thank you. Ean, how can participants bring back their experience from participating in these competitions back into work professionally?**

**Ean Chan:** Yeah. I think that's a really interesting one because I think Kaggle often gets compared to like 'the Olympics for data analytics' where, the best people will work the hardest for the slimmest of improvements. Right. Just that the extra bit better, which sometimes isn't that practical. So, what does that mean for practical working professionals? It means that a little bit, you have to tease out what's useful about the process itself. So, I work in consulting at EY, which means my work can vary pretty widely depending on the project I'm on. Sometimes that includes entering another domain. That's a skill that you pick up with Kaggle, right? You're just dropped into, I guess, a place where you have little or no domain knowledge and you get to start doing data analysis, right and then you can just kind of dive straight into it and picking up the skills you need to be able to just jump into a new domain, you can definitely get from Kaggle.

**Ean Chan:** There's like that element, I guess, of creativity there, which you need for good data analysis. I would be wary about focusing too much on like on just minimizing loss functions. In the practical workspace, you're trying to come up with some insight that informs an action you can take. You aren't restrained by the data given to you at the start necessarily because in the real world you can go out looking for more data sources while true, to an extent for Kaggle, it's probably a bit less true than in the real world and so I think the steps which will always be useful, which you do in Kaggle are data cleaning. There's a lot of that feature engineering.

**Ean Chan:** There's a lot of that. And then the exploratory data analytics, aiming to visualize and understand the data first that's, that's always going to be useful in the real world.

**Kriti Khullar:** I liked your metaphor Ean of comparing it to the Olympics.

**Ean Chan:** It's not mine but I will take credit for it.

**Kriti Khullar:** Might be motivating few more people to participate, perhaps. Marcello, what's your sort of take on this?

**Marcello Negro:** Yeah. Ean makes a good point where to some extent the Kaggle competitions competition itself is quite artificial and it doesn't really align with what we do in business in a commercial sense, right? The end goal of when you're running an insurance company or thinking about investments or whatever the case may be, isn't just to minimise your error function or your error on your model. That's never the end goal, right? The end goal is like in acts on real world change that helps customers or the business or something. Right. So, you got to keep that in mind. I think when you do these competitions and well, at least that's my justification for never being top of the leaderboard. Right. I'm like, 'nah, I don't need a leaderboard'. It's never about minimizing the error for me.

**Marcello Negro:** I'd encourage people to keep that in mind, but in terms of like what I've taken away or brought back to my work professionally. It's been a whole bunch of things. As I said earlier, learning new techniques, keeping abreast of what's going to up to date, or what's going to be the state of the art in the market, I've been really useful, but it's even been kind of really specific things that I've learned, been able to bring back immediately. So, a good example is one of the kind of earlier conditions I worked on or played around with everyone was using this particular machine learning model. This is back in 2015 called XGBoost. Maybe it was 2016, but anyway, and we never really used it at work much and I said, why don't we try this out? So, we did a bit of it at work and now we use it quite a lot. So that's a direct example of bringing it back to work.

**Marcello Negro:** Other more minor ones are just some tricks that people have when they do feature engineering go, oh, that's actually a really, really nice trick to that. There are really interesting way to frame the problem. I can definitely bring that back into a model that I'm working on work. So yeah, there's, there's definitely things you can bring back to your work professionally. The other kind of one that I think we've brought back to work at Finitly is just the mentality and the idea of these competitions. So we actually ran an internal machine learning competition. We posted ourselves, we posed a problem to everyone who works at Finitly, it was a data problem. We gave them a data set and said, predict this thing.

**Marcello Negro:** We gave them a column of historical values, quantities, and then said for this unseen set of data, give your best guess at what the values are going to be and someone did a really good job and won. And their work ended up kind of forming the foundation of a new product. We ended up building a few years later, and I remember sitting through this competition and Sarah, this girl that won was presenting it and I could see people in the room, senior actuaries there going, 'oh, that's a really great idea. Maybe we can build something on that'. That for me was a direct example of bringing the idea of a collaborative participatory competition into work that led to a kind of great outcome. That's something I definitely brought back.

**Ean Chan:** How did you do Marcello in that competition?

**Marcello Negro:** I set the competition up so I couldn't participate, but I don't think I would've come up with as good a solution as what the winner did. Actually, it was a really innovative one and that's part of it. Like I had a preconceived notion of what I thought the best way to solve the problem was and someone was actually outside of the main domain of, of this area just solved it completely differently and I mean, that's the beauty of these competitions. You have diversity, and which leads to better creativity, eventually better outcomes.

**Marcello Negro:** We've taken that on board for quite a lot. Like we have regular discussion forums about particular concepts and they're really open just people saying, 'oh, have you thought about doing it this way?' 'And you know, a lot of time we say, 'yeah, we've thought about that'. But other times it's like, 'oh, we've actually never thought about that' it's completely separate, left to field thing that could help out whether it's from a medical domain or, someone's had experienced in a previous life when they were an engineer and they say, oh, in engineering, we used to think about things like this. Collaboration is such a powerful thing and that's what these platforms do.

**Kriti Khullar:** **Just linking back to the diversity question, I probably asked earlier as well. So perhaps they were part of that 16% women who participating in the Kaggle competitions, perhaps not. Ean, I'm just curious to know, how many hours of effort is generally required for one to participate in any of these competitions.**

**Ean Chan:** Yeah. So, I'm going to start with a cop out answer, which is any amount of time you like, it can be as many hours as you have free. So, you can start by just spending one hour, like reading the question, thinking through how you would begin. You can look at the available data, think about what cleaning you'd have to do. Think about the feature engineering and think about a possible model structure or architecture that would, that would suit the submission criteria and then you could stop there. Right. But if you have more time, you can start reading some other submissions.

**Ean Chan:** If you just have a little bit more time, you can read their submissions, you can copy the starting notebook for it and then work only on the pieces you want to work on. Right. If you just want to do feature engineering, you can start at that step and skip some of the other, I guess, data cleaning bits that you're not so keen on and so it is really flexible based on what you want to do with it. I think as we've alluded to earlier, if you want to go for a medal or try to really hit high on those leaderboards, there probably is a lot of work, like probably a few weeks of or every night, some kind of effort involved and then yeah, if you're going for the money, the actual cash prizes, you're probably spending months to track.

**Marcello Negro:** If you're working as an actuary and you're looking to kind of make money on Kaggle, my suggestion is stick to your day job, to be honest.

**Ean Chan:** Yeah.

**Marcello Negro:** Would you agree?

**Ean Chan:** I would definitely agree with that.

**Kriti Khullar:** **Marcello, any advice for those who might be keen?**

**Marcello Negro:** Back on about how many hours, how long do you need to get any value out of it? Like, even if it's just simple as going on to Kaggle signing up, which is pretty straightforward and searching all the historical competitions for the ones that relate to insurance, there's probably about five or 10 that have been related to insurance. There's a few Life Insurance ones. There's ones around predicting quote conversion, like how likely are customers to buy insurance ones around predicting claim frequency, claim severity, and just reading the top solutions are really valuable. Like one that was particularly valuable for me was one from a few years ago about claims severity predicting and the size of the claim and the approach that the winning solution had was really good. It was an ensemble-based approach but done in a kind of really structured way and it was one of the better solutions. Just going on, searching for the particular domain that you're interested in and reading one or two discussion posts. It'll take you half an hour, but half an hour, well spent in my opinion.

**Kriti Khullar:** **Great tip.**

**Marcello Negro:** Once you get started, like once you go, oh, that was easy. That's half an hour of reading. You you'll probably go, oh, well, let's see what these kernels or these, these example code files look like, and you go into that, and you go, oh, okay. Oh, I can run it and you, you end up running someone else's code and, oh, that's cool. I was able to run some Python code without even installing Python on my computer and then you, you

know, you reading someone's code and you go, I wonder if you just added this extra factor in the model.

**Marcello Negro:** I mean, you know, you uncommon out that line of code and you added extra factor to the model, and you run it and you go, oh, it was interesting. And then before, you know, it, you it's half your Saturday spent and you're doing Kaggle.

**Ean Chan:** Iterating on other people's work is like, part of all of it. I think.

**Kriti Khullar:** Ean, any other general advice for anybody else you might be keen for joining in? Yeah,

**Ean Chan:** Just jump right in. Well, what we've been saying the whole time, like if you hate the slow starts and setting up and admin type stuff, as much as I do, I think Kaggle is a great spot to start. Yeah. Just because as Marcello said, you don't have to set up Python or R Studio or whatever else you're worried about. It's just hosted online. You can type in a few lines of code and see what pops out.

**Kriti Khullar:** Awesome and then speaking of which Marcello, how can people sign up for these competitions?

**Marcello Negro:** Kaggle is really easy. Go in, just set up an account. It's pretty straightforward. Take you all five minutes. Some of the other ones are a little bit more are harder to get involved in. There's just, in my opinion, you're slightly higher barrier to entry. Kaggle is just well-documented and well-resourced. So, you can do that, but it's not going to take you longer than five or 10 minutes I think on any of these platforms. So yeah. Signing ups. Great. That's all I can say. I had a question for you Kriti, which is what competition are you going to do next? You seem very keen on this stuff, but you haven't done it.

**Kriti Khullar:** I think I'll go for the one, which is probably free and coming up next. I think that's the one I'll probably need to go and research and just go in, like I'm thinking I've heard Kaggle competition quite a bit today. I've heard the, the AI Crowd. And there was another one that you mentioned.

**Marcello Negro:** Numerai.

**Kriti Khullar:** Numerai, yes. That one as well. So, there should be a professional / personal goal for a data nerd to hit one at least per year. Even if you don't submit, keep up with industry standards or at least skip get exposed to it. But your iterative approach of, maybe I might tweak this, but thanks very much Marcello and Ean, unfortunately that's all we have time for today. It was a pleasure to have you both on the Podcast.

**Marcello Negro:** Thanks so much.

**Ean Chan:** Thanks. It was a pleasure being here.

**Kriti Khullar:** Awesome. Listeners, we hope you enjoyed this discussion. You can listen to more Actuaries Institute Podcasts by visiting the Podcast section of Actuaries Digital or via all mainstream Podcast apps. If you'd like to continue the conversation with us on social media, please follow us on Facebook and LinkedIn @ActuariesInstitute and on Instagram and Twitter @ActuariesInst. Please write in with your questions and comments on the show. We love to hear from you. Thank you again for listening. I'm Kriti Khullar, bye for now.

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