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Podcast #1 David Gertler

Hello and welcome to our alumni Mentor podcast today. We hope to bring those who are listening a bit more into the world of financial technology or fintech as we call it. Fintech is the foundation by being the mechanics from which all Financial transactions take place everyday and everywhere. Usually fintech works great and goes unnoticed but is vitally important. So we're here to shine a light on what most take for granted. I'm Christopher Henze a fintech Communications professional I've specialized in telling the story.

Our goal of the podcast series is to help Cornell engineering students to understand and consider a career in the financial engineering fintech world on this podcast series. We hope to hear from alumni and other presenters across a range of experience from recent grads to those with many years in the field this first in the series is the conversation with David Gertler about his thoughts on careers in the industry. David has a BS in Ms. Degree from Cornell or

Graduating in the late 60s. He has over 40 years to talk from so welcome David. Let's start off by me asking a bit about your idea of using social media and podcasts as an approach to helping students. Think about a career in fintech. Thanks Chris. Your question is a great starting point for today. So yes, I graduated from the Cornell or reprogram and that was in the Stone Age of fintech at the time. It was called the IEOR, IE for industrial engineering.

Oh, and of course today, the letters have been reversed where the IE is for information engineering. that alone is just one small indicator the change. So at the time of my graduation I had zero idea of the direction of my career and I hear today that many students have the same dilemma. So, I became very interested in using my experience to help Mentor students. I took a recent trip to campus.

It was a typical a winter day ... it was cloudy, cold and windy, but I received a truly warm reception from the students and we had really great discussions. the feedback suggested that I use social media. I bounced the idea off of fellow alumni and Industry friends many said, they would be glad to participate in future sessions. I envision a series of 15 to 20 minute podcasts and will enhance them with the ability to directly link to the speaker through a community blog, individual chat sessions, and phone calls. all with the goal of giving students perspective on fintech Career.

That sounds really exciting. I've known you for a long time and what you've done in the industry. I think students would be interested in hearing a brief thumbnail of your career path. Tell me about it.

Sure glad to talk about this and I hope my experience is will give students some perspective as they consider a career and fintech.

My first stop after graduation was at Grumman Aerospace, but I quickly became interested in finance and changed direction. I started at Salomon Brothers in 1973 and it was a fantastic job, only we didn't call it fintech at the time. My mission was to use re techniques to give traders a sharpened competitive edge. my role there led to the launching of the electronic joint venture also called the EJV. let me tell you a bit about that.

It was a time when banks were investing enormous sums in fixed income research and giving it away at no charge. And, it was also a time of shrinking margins at these firms. We created a consortium of six Banks and the goal was to release value by collectively selling research to clients. It was a novel concept. up into then revenues were solely derived from sales and trading and Investment Banking. EJV became a separate firm; it was one of the early large-scale Market data vendors. We were eventually acquired by Reuters.

After EJV, I did a few other things. then about 10 years ago I joined a company called Superderivatives, also known as SD which was acquired by the Intercontinental Exchange also called the ICE.

Chris: I've always been fascinated by all of the arcane terms in the financial industry. EJV/ SD ICE.

Yes, Chris, that's true. The widespread use of acronyms was sometimes used to solve technical problems.

For example, the vintage ticker tape machines have limited capacity. the technologist of the day needed to save "bandwidth". So a long phrase such as American Telegraph and Telephone simply became "T". anyways back to the superderivatives story. at that point in my career. I never never imagine working at an Israeli startup. And by the way, if you're interested in this sector take a look at the book called the Startup Nation.

At SuperDerivatives, our mission was pricing and risk management for derivative instruments. We used yield curves and other market data plus a range of options models. an excellent example of wide scale use of Ops research as well as information engineering disciplines. I left the ICE about a year ago, and now doing some advisory work for a few high-tech startup firms.

...I started my career with a highly technical position and over time evolved to product management and strategy roles. But the specific direction is up to you regardless of a technical or management role. My advice is that you embrace change and be prepared to seek roles that are relevant to evolving Industry directions.

Chris: Can you give our listeners your definition of fintech and financial engineering these terms are often used interchangeably.

my definition of fintech is use of analytics and technology to create efficiencies and improvements in the financial sector. The playing field for fintech is quite large includes Banks brokerage firms investment firms, individuals, hedge firm hedge funds and stock exchanges among others. fintech can also include disruptive technologies such as Bitcoin and blockchain. There's also the large commercial banking and payment side, but that sector is not my expertise. And for this I will invite speakers for future podcasts. financial engineering sits within the broader fintech definition, some examples: carving up a pool of mortgage collateral to create financially engineering instruments with cash flows to meet investor needs is an example of financial engineering or creating a derivative contract to exchange. for example a foreign exchange currency swap to transfer currency risk of a Japanese car manufacturer that also has supply chain costs that are denominated in Euros whether the role is described as fintech or financial engineering. I truly believe that the ORIE trained student can find fascinating roles in this field. It can be a deeply technical role or management role, or both.

Chris: this term fintech. It didn't exist. When you graduated, please tell us about the changes you have seen over the years

David: take a look at any photo Archive of the New York Stock Exchange from a hundred years ago. in 1920, you'll see vintage telephones and a ticker tape machines, roll forward another 50 years to 1970 in the same physical room, but with emerging electronic billboards and computer screens, and then roll forward and another 50 years to the present time. mostly electronic no paper on the floor, TV studio scattered about, fewer people on the floor, and even more casual dress. traders in 1920 could never have imagined The Exchange floor in 2019. Here's another example high frequency trading firms. As you may know they arbitrage small price differences and nanoseconds matter. So fast fiber optic networks were used. then engineers figured out that microwave was faster. There's a great book on the topic called Flash Boys by Michael Lewis. So there was a rush to build microwave towers, but line of sight was a limiting factor to microwave towers, recently some smart fintech engineers developed error correction algorithms and applied it to radio wave technology. 20 years ago, everyone thought that fiber optics and microwave were the best solutions yet, bright people continued to find a better solution.

there will continue to be a sea change brought about by new processes new technologies and skilled ORIE practitioners with the knowledge that apply the latest Innovation.

Chris: I know I'm about to throw you a tough question, but can you look into your crystal ball and give us your view of the future.

David: Chris, somehow I always get asked this question. So, if I had a crystal ball, the first thing I would do is to check the closing value of the market tomorrow. To be serious. I'm very glad to give my perspective and I'm sure you have heard of these things before but they're especially relevant for future ORIE practitioners.

The first is risk and the regulatory environment. It's highlighted by the 2008 financial crisis. But this topic has always been with us. How do we monitor and measure risk? How do we remediate risk. fintech is and will continue to play a major role the next our cloud-based services. 10 years ago many Financial firms were highly resistant to putting their applications and services in the cloud. It's no secret that this view has changed dramatically, mainly due to factors such as cost and processing efficiency.

The third topic is AI artificial intelligence. It's a fascinating theme with many technical and social implications. fintech is certainly on the AI bandwagon examples are: Robo trading for investors and AI techniques for hedge funds where decision-making is in nanoseconds. it's just too fast for human interaction, and the fourth that I'd like to mention is Big Data. Big data is perhaps one of the most important of these examples. It is the critical enabling technology needed for many FinTech products and services. that said big data brings about its own issues that need to be solved: data accuracy quality breath the data, and ownership of data.

Chris: David in closing. Do you have any other advice? Y

David: Yes, I have some thoughts on networking. This is not computer networking, but people-to-people networking. I have thousands of contact on my phone, but in truth, I'm not in continuous contact with each of them. But I do have a reasonably large subset marked as favorites. My suggestion is that you continue to develop your people Network and stay in touch with them. go for quality, not quantity. much easier today with LinkedIn and Facebook, but it still takes effort also reach out to friends and alumni . ask to spend a day with them at their workplace sit next to them to understand what they do in their daily life, shadowing five people for a day can be just as valuable as a five week internship at one firm.

Chris: in future podcasts, we will feature other fintech practitioners and will give you a sense of how they spend their professional day. Sounds like great advice and you've given us so much great information eternally grateful to you and I hope those that are listening or more informed about this and you'll be looking to listen to our next one. Thank you David

As we get to the end of our first session. Let me mention that for more info. You can go to www.alumni-mentor.com. The plan is to use social media approaches to provide career insights to the Cornell students about the fintech sector and will do this through conversations with Cornell alumni and other presenters across a range of experiences from recent grads to those with years in the field. Thank you for listening and please subscribe to the podcast so that you would be ready when the next one comes out.

Podcast #2 Victoria Averbukh

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology or fintech as we call. It fintech is the foundation by being the mechanics from which all Financial transactions take place everyday and everywhere. Usually fintech works great and goes unnoticed but is vitally important. So we're here to shine a light on what most take for granted. I'm Chris Henze a fintech Communications professional. I've specialized in telling the story of fintech for

a high level companies in the sector or goal of the podcast series is to help Cornell or E students to understand and consider a career in financial engineering fintech world on this podcast series, we'll hear from alumni and other presenters across a range of experience from recent grads to those with many years in the field today. We are speaking with Victoria a brook. She is a professor of practice at the Cornell or E school and it's the director of The Graduate Financial engineering program which spans two campuses ethica.

And Cornell Financial engineering Manhattan are CFE M. Which is located in New York City. Hello, Victoria and welcome. We're very pleased to have you join our talk about careers and thin tech for ORIE students. Can you take us back a bit and talk about what led you to become in or student? Thank you Chris for having me. I'm very excited to contribute to this mentoring bad cost. So going back. I have to say that discovering the discipline of operations research was

probably one of the most fulfilling things that I have done in my life. I was a math major and somehow getting an advanced degree was never under question. The question was what area of Applied math. I really wanted to focus on to this day. I still remember reading for the first time about George dancing and Simplex method. I was at math library and Curran Institute, which was place of my undergrad as a Communications guy.

From for me perspective now, you're already over my head with this mathematic complexity. What is this that you're talking about? So Simplex method is one of the ways to solve complicated optimization problems where you try to figure out in for example, which way you want to deliver Goods in the most optimal way. In fact what really

Won me over is one of the first things I read is for example, they use these methodologies during the second world war to deliver weaponry and to deliver goods from the factories to thanks for answering that question. This is one of the reasons why I love this podcast Series so much because when you ask Highly Educated really smart people questions, they explain things to you. So you really get to understand it. So I've interrupted your story about yourself. Once you continue down that path absolutely real.

Hanging down six book and about Simplex method led me to this amazing world of optimization and operations research with all its broad applications many years later a couple of careers later. I still believe that for someone with interest in mathematical applications or our offers an

amazing set of skills for any type of problems. It entwines optimization and probability and statistics. And of course these days also data,

Science leading to a better decision making for any area you choose but of course I digress a little I can talk about operations research for very long time and make it interesting. I hope so I hope so. I was admitted to Cornell or e as a PhD student and there and I discovered that Financial engineering as a discipline was actually pioneered Anisa campus by Pernell faculty a few years earlier and for me that was

At my thesis focused on applications in finance. I was advised by world-famous faculty. And with that I got my first job at Salomon Brothers as a fixed-income cell site strategist and then a few years later. I moved to Deutsche Bank spent wonderful 10 years on Wall Street and then at some point or E approached me to start Cornell Financial engineering Manhattan, and that was an absolutely irresistible proposition. I could combine teaching together with

with building practitioner let programs and I love doing what I'm doing now for 11 years. So your role here at Cornell is your crafting the way we interact with. So my role at Cornell is to ensure that our students receive not only theoretical education on Ithaca campus, but they also receive Hands-On practical education. And how new is this. This is 11 years. We graduate our first class of students in 2008, so

I hired me in 2007 and I built see found. That is so cool. Really? I think so. We have people who have real day jobs. They work in hedge funds and asset management companies and they come in the evenings and teach our students and these are full-blown credit-bearing courses amazing really cool. So you talked a little bit about Solomon Brothers and being at in the the career field where some of the skills you've acquired on the job self-study or whether you from the academic world at Cornell to be honest.

With you it was a mix. I was certainly hired for the skills that I've developed at Cornell specifically math and especially statistics and probability. I also had strong financial mathematics base, which was not a common thing at the time for someone with an engineering or science PhD, but I was not a strong programmer. In fact, I hated coding and guess what I had to learn on the job my first responsibility.

Was to build a production level model, doesn't it come up that the thing you resist is the thing you wind up having to pay the most attention to an attorney for beer complete for Bia and my first responsibility is building a production level model that our trading desk was using on a daily basis to make trading decisions. Wow. I still remember the nightmares. But basically I like I said, it was a mix. I had really to learn a lot on the job and not just about

Coding and at that time we coded in C or C++. But also what it takes to build the production level code. What an interesting thing to actually create something our have a problem that's existing to then work your butt off in a way to get that solution. And then you see it actually taking place in the real world and to have that instantaneous feedback. It's pretty for must have

been produced. I mean hectic but at the same time rewarding absolutely rewarding and this is how I also earned my reputation of

Good and reliable and play and I think because they persevered through that and I did work very long hours, but I persevered and I dealt with braiders when something did not work and I also had to rely on other people for input into our my model garbage in garbage out. That's what models do. So I need to ensure that everything works. That's what I mean by a production level code. So there were a lot of moving parts that I had to learn how to deal with and put together but because I did a good job iron.

The good reputation and when I said that enough's enough, I was allowed to move to other things that I found that I'm interested in doing. You know, gift of what I get to do is I get to talk to a lot of very high level people Financial technology is one area that I've engaged in and one of the common things that I find is this ability to relentlessly execute on something to take a need to fulfill that and then relentlessly execute on the solution so that it's going to work and you definitely presents possess that

- execution facet. Let me ask you another question in hindsight. Are there some courses that you regretted not taking? Yes. I wish I took accounting. I always thought of us to easy relative to other subjects and frankly. I wasn't particularly interested in accounting no offense to any of the accountants listening to this podcast. I don't think that they'll take any so I figured that I'll pick it on the way as needed and to some extent I did learn.

Learn some of that on the job as I was covering mortgage-backed Securities and US Treasury Futures and other bonds, but I was never comfortable. I really was never comfortable with the basics. I think having the basics of accounting and the basics of corporate finance as qualitative as it may seem for somebody going into fintech is important no matter whether your focus is more on a quantitative aspects or not. I wish I paid more attention at grammar.

I understand that you worked at Solomon and Deutsche Bank. Please tell me a bit about the work environment inside an investment Bank both the good and the challenging Parts. I loved investment Banks and I was surrounded by a lot of smart people who didn't just know the markets or how to price bonds or how to hatch positions, but they had an incredible intuition into the financial markets and that's what made the environment exciting.

Gin, but also wanting to be part of it Solomon was the bond market power house and to this day. I actually keep in touch with people who interviewed me for that very first job. It was very Dynamic very fast paced environment. My job required me to work with a lot of different people trade or salespeople clients constant business trips, but overall if I were to use two words to describe the environment, I would say challenging and competitive.

Kitchen Salomon Brothers, is that the connection that you have with our other podcasts subject David gertler? Yes David and I connected as Carnell alumni and also because of my involvement with CFM and Ori, but we immediately connected talking about Salomon Brothers now

Salomon Brothers isn't around anymore though. It's a pretty storied Bank. We're talking to some students who are right. Are they going to even know what Solomon Brothers is? How does that work? I'm

Make sure that our students not only know about the companies today. So Solomon was merged with Smith Barney and became Salomon Smith Barney Dan City came alone. And now it's just City students need to read the literature about financial markets, whether it's fiction or it's you know fiction based on real stories and there's plenty of that floating around I teach the bond mathematics and mortgage-backed securities course and in the beginning of

Semester I always ask who read Michael Lewis's liars poker book because that was about Solomon Brothers. I tell them how Solomon Brothers came to be. They were the first the only really Bond Trader on the street others traded equities. They traded bonds. It was a very interesting environment in deed and one of the things about from my perspective that that the history matters because as much as things have changed they're still it's still the same.

In ISM it's sort of like, you know, I'm in the film industry mostly and and they got it right in terms of how to film a film in 1920. And so we're still we haven't reinvented how to make a good film yet because it's not necessary and I think to some degree trading a bond and pricing and these sort of things. It's not all that different. It's just the speed and the accuracy and those sort of things that change. Can you talk a little bit about absolutely correct? They got it right how to trade back in the Middle Ages when they started

Writing wheat and sugar and pour back in treating stuff for a long time, right? He had blow-ups like the Tulip crisis way before the mortgage-backed Securities crisis. So I think human certainly have a tendency to repeat history, but it doesn't mean that we should absolutely ignore because we can make we will be making mistakes, but we will be making new mistakes and hopefully we will be more educated indeed indeed.

And let's talk a little bit about a career path at traditional Banks versus careers at fintech startups. What's your point of view of the pros and cons of each if you don't mind, I would like to go a bit broader and try to compare traditional Financial engineering roles in Banks, but also hedge funds and asset management companies versus fintech. I believe that a start-up fitting into the culture is so much more important than at the large corporate institutions.

Some yes culture is always important no matter where you go. In fact when our students have been interviewed for jobs. They do have to demonstrate that they're a good fit within the team the bank or hedge funds Etc. But at the startups the defect is magnified the other startups. I think that a fact and the the need for match within the culture is magnified by the move starts are trying to move so fast that any little grind in the way you fit into that puzzle can can really have

Attic effectively. Absolutely. I think that startups also require more interpret mural spirit and more thinking outside the box. It is probably more important to think independently and to be

also more mature to understand what the end result of your work really means for the success of the business. I also think there's a higher chance of losing a job if you are a start-up because it may not take off the way it may end up. Yes. Yes exactly.

I mean, I'm not sure if these are Pros up cons there just differences whether you like one versus the other really depends on your personality. I often remind our students that self-reflection is very important in the beginning of their careers and they need to think of what they like and want to do personally. I never wanted to be a part of a start-up so I worked for big Banks and now I work for another large company, which is Cornell University, which

Started up a division. Yes. I do have an interpreter and frankly to be sell-side strategies. You also have to be a little bit interpret inaugural because you are a communication vehicle between you know trading and sales to ask on the clients and you need to present different products, but I still like the umbrella of a large company exactly right and people find their fit and they find what works for them. And that makes a lot of sense and what works for you is what you've done which is a little bit of a hybrid of each where you've pushed things forward into the

World and you've also done that Under the Umbrella of large organizations. It's pretty impressive to me. Can you tell me your thoughts about the benefits of going directly to grad school or working for two to three years before grad studies? Well, I think that if one wants to get a mustard degree waiting a year or two and making money before joining the program may not necessarily be a bad idea you get certain maturity and Independence on the job that can frankly be beneficial during their studies in a

Optional program like ours, but it is not a requirement and depends on one's background. Someone may need a graduate degree to even make it into the job that they want. However, to be honest with you. I would caution working for more than just a couple of years if a graduate school is really your goal at some point Graduate Studies are not easy and they require different type of organization and attention that the ones that you Hong on a job. So

To some degree the continuing education. I'm understanding for Ori is that I believe in mentors. I think it's a really amazing thing to do and somebody comes to get an education and already you're embedding yourself into a group of mentors because as you pointed out earlier, there are people with real world experience that are guiding you through your studies. And also if you have a little bit of Real World Experience, then you understand more of what language they're using and or like you said, there's some that need to

have a specific understanding or degree before they can even understand the job in your view what has been the biggest challenge facing the fin tech industry since you've graduated. That's a loaded question this mean no challenges. No, no, no and the will be rely on some models and quantitative approaches has really grown over the past decades and the trend is here and stays it continues as a result. I think there's a significant need for coherent and uniformed.

Solutions that also simultaneously allow for future flexibility. This is not a new challenge and it is not an easy task rely on technology is great, but it has to be transparent and easily modifiable. Another challenge in my opinion is a continued emphasis on developing new products and solutions that fit specific investors needs and increase profitability. I mean after all we talking about Finance so people interested in

In profits moreover, I believe there is a growing interest in balancing profit-making with social responsibility. Every company wants dedicated and loyal than place. I think we all agree on that. But in these days in please loyalties come with a desire to contribute not only to the company's bottom line, but also to the issues faced by Humanity, so I believe that those who blueprint new Financial products or Solutions

We'll definitely have to address this desire to make a positive impact on the world. Are you finding that your your students now are receptive to these messages of social Consciousness. Yes. Absolutely. I think our students are more conscious of what the work that they do will mean for the future generation of whatever causes interesting. Yeah. I know I could imagine bringing up that subject 30 years ago at Salomon brothers and people just laugh any bank to be honest. What?

You know the bottom line and profit profitability where the only things that anybody concerned about. I know now our students have more discussions on the jobs and during their internships about issues facing Humanity these that's good. Very good in closing. What are the key things to consider when thinking about a career in fintech. Well, I have to say that for those who never had a job yet and starting out either, right?

After undergraduate degree or right after a degree, like ours think of your skills and your interests before you think of a specific rule the world of fintech is so broad. I believe David gertler described it in the one of the previous podcasts your first draw your first job does not matter in the long run as much as the skills and the value proposition. You bring to the table empirical modeling modeling under uncertainty.

Computer and proficiencies are very important equipped with these skills one can be very successful in fintech. Also. I have to say that for those who had had roles in traditional Quant finance and are looking for a change to fintech. I would encourage looking into startups Consulting data-driven due diligence roles Consumer Finance, even traditional Investment Banking m&a and private Equity are looking into data scientist with Finance knowledge and all of these can lead to exciting

eating and long-lasting careers and fintech wonderful. Well, thank you for your time. Absolutely. Thank you for having me our pleasure. Thank you Victoria as we get to the end of this session. Let me mention that for more info. You can go to www.hsnmentor.com. The plan is to use social media approaches to provide career insights to Cornell students about the fin Tech sector and will do this through conversations with Cornell alumni and other presenters across a range of experience from recent grads to those with years of experience. Thank you for

or listening and please subscribe to the podcast so that you will be ready when the next one comes out. Thanks.

Podcast #3 Marcos Lopez de Prado

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology or fintech has we call it fintech is the foundation by being the mechanics from which all Financial transactions take place every day and everywhere. Usually fintech works great and goes unnoticed but is vitally important. So we're here to shine a light on what most take for granted. I'm Christopher Henze a fintech Communications professional. I specialize in telling the story of fintech for many high level companies in the sector.

On this podcast series, we'll hear from alumni and other presenters across a range of experiences from recent grads to those with many years in the field. Welcome to the next podcast in the series today. We are chatting with dr. Marcos Lopez de Prado. He's quite a busy guy at the Cornell Financial engineering program in Manhattan. And as the founder of true positive Technologies also known as TPT, which deals with big data and machine learning so welcome Marcos to start off with can you tell our listeners a bit about

Doctor or field of study at Harvard and your career Journey leading up to becoming an entrepreneur with TPT. Thank you Chris for having me for the past 20 years. I've managed investment portfolios for a number of asset managers and hedge funds always using machine learning high performance Computing big data, and this is a very evolving and dynamic field of research. So I've always felt the need to combine the application of these techniques with

Constant research and Improvement. So that's why what I was managing these investment portfolios. I had I was also research fellow at Harvard and also Lawrence Berkeley National Laboratory where I conducted research on supercomputing and machine learning. My research has also has always focused on how can I deliver better investment portfolios, utilizing large amounts of data and computing power and what I have found very

Satisfying is to be in a very applied field while at the same time. I'm dealing with very academic and theoretical aspects and I think this helps each other the fact that I had to put these ideas into work kept me very much with my feet on the ground when I conduct my research so that my research doesn't become too theoretical or abstract. But at the same time the fact that I would only deploy techniques that are scientifically sound

Sound and robust also help me keep the academic rigor. So when you say it's a few years that even applying machine learning, you know, it's fascinating to think that this whole idea of machine learning. I mean, was it seven years ago 10 years ago that nobody is even talking about it in a way and now it's everything will you always pushing into this field and you discover that all I could apply this here? How did that come on to you that machine learning grew into everything for you. So I guess this is the secret inside there is story of machine learning the real

He said machine learning has been used for many decades in Research Laboratories. When you think of biological research or medical research chemistry Material Science astrophysics. This

research Labs have used machine learning for many many years and it is now that finally there are consumer products and services that utilize the technologies that have been brought up to our attention. So when Google Facebook

Facebook Netflix Amazon Etc. Use this technique. So probably Siri was most people's first win and Welfare and behind that was their first sort of real that's experience. So they these have become very present in our lives. So when you edit this podcast you will have a number of signal extraction algorithms that are going to clean the data compress etcetera and the underlying technology behind. These are various machine learning algorithms.

So all of these has become now very seamless but the reality is that these techniques have been at the center of scientific research for many years and at Lawrence Berkeley National Laboratory. A lot of the research that is done in terms of understanding the age of the universe or the speed of acceleration of the expansion of the universe or modeling climate. All of these research is Power by Machine learning algorithms. Amazing. How did all this?

This sort of become TPT for you. It was by popular demand. So for many years investors have asked me why I even launched a firm to offer this kind of solutions to a broad community of investors and last April. I was fortunate enough to sell some of my patterns to a QR where I was a partner and its first head of machine learning with the

It's all of that sale. I realized well, this is a great opportunity to launch a firm dedicated to the application of these modern Technologies to critical problems in in the investment World. TPT. Sounds like such an interesting Venture and I love the fact that it was demanded of you. And why was it demanded of you? There have been problems long-standing problems in finance that have not been

Properly addressed for decades think of and that's related to machine learning are just okay.

The problem is that financial markets are extremely complex. There are more complex than weather systems. There are more chaotic. Wow, right? Think about it weather systems. I still follow very immutable natural laws a hurricane doesn't learn how to evade our forecasts are phases do not shift in order to prevent our recognition for what about that butterfly flapping its wings in China affecting their tornadoes that happens, you know about it. Yes, and that happens in finance to

oh, yeah, right. The difference is finance is much more evolving and dynamic. I mean people who lose money this year will not be around next year to manage money. Right people learn from mistakes as a result the ant the natural laws that fuel Cottage systems in nature, like whether this in-laws are not immutable in finance. So Finance is an extremely complex subject.

And in order to extract signal from financial markets, you need very complex tools. So the problem is that for the past 40 50 years the kind of empirical methods and quantitative

techniques that have been deployed in financial markets are relatively simplistic compared to the task at hand and investors have realized that in order to tackle complex problems you need

Complex methods. That's the reason for the popular demand that's amazing. And so I understand that some of what you do is you are looking at the machine learning and then interjecting some guidance to the way it should look at the data so that it extracts more signal from the noise. Exactly. So the problem with the application of machine learning to finance is that even though machine learning is extremely powerful and that's why we love it because it's able to I had

fight this patterns in the data that very virtue becomes problematic in finance. Why because the algorithm will always find a pattern even if there is no pattern and financial markets are very very noisy. The amount of signal relative to the amount of noise is very low and as a result it is possible that these algorithms recognize a pattern in the noise instead of

recognizing a pattern in the signal. Well, the noise has a pattern but it's just not a valuable. It's not a valuable, right? So that's the problem of back this overfitting when people misuse machine learning algorithms in finance. What happens is that these algorithms are extremely powerful and they will detect a pattern in the noise with the belief that this is a pattern in the signal and that causes the problem of false discoveries. So the idea of TPT

is how can we deploy these techniques in a way that we minimize the probability of a false Discovery and there are special techniques for that that are specific to finance and not specific to other problems in this is one of the things that I love about the fintech area that here you are professor and and you're a thought leader on the concept of thinking about machine learning that you form this company that was demanded of you that now

things that you thought about maybe many years ago are in practice in the real world having people succeed with them and then you're using whatever they learn to change your thinking and it's one of these industries that is so responsive in general. It's quite inspiring. Yes. So in fact, my father is an engineer and of course he wanted me to be an engineer and for him that the time that takes for a project from the moment of

Design completion it can be 10 years. Yeah, right and and and of course, it's very satisfying to an engineer to see the product of these ideas to materialize. The reality is that it takes a long time and and you need a lot of perseverance and hope and patience in finance. The feedback loop is almost instant. Yeah very quickly you

You realize this is not working as expected or design and you can make Corrections and Amendment. So that's something that I find very interesting about fintech in general but Financial machine learning in particular that the learning curve is so fast. Well, I don't usually quote historical presidents. But this is one I have which is it was Calvin Coolidge. You said the most sensitive nerve in the human body is the pocketbook nerve.

Right. And so here we have that feedback because if you're wrong, you're looking at balance sheet that you know like and if you're right, you're like, well, let's go out to dinner TPT is a captivating story. You're truly on The Cutting Edge with this exciting service. I think our listeners would be interesting to hear if TBT was part of your master career plan or whether your interest in this area evolved over time. It is it is part of a long-term plan going back 20 years ago. I realized that at some point in time.

I'm computers will be sufficiently powerful that less and less discretion will be needed. I didn't know when but to me it was clear that at some point in time. All of these discretionary Traders will become unnecessary. And what we need to do is we need to be prepared for the situation when the amount of data needed to make decision is so overwhelming that the human brain is not able to process it.

And we are finally in that stage. The amount of data is so overwhelming that today. There is no human who can process all of this information and making informed decision. That's where machine learning comes in with an understanding that these algorithms are not as smart on a small data sets as a human human is particularly good at small data sets. That's how our brains evolved now our brains have not evolved to process.

Large amounts of e of information right? Our brains are very limited in a sense. We cannot visualize things Beyond three dimensions. Think about it. How absurd how only three how irrelevant how are we trying? Why not for dementia? Why not? Why not ten Dimensions? Why not a hybrid goodness sakes? Yeah, Jesus. I feel so limited now. That's right, but that's what kept us alive. I mean our brains are

Therefore purpose our brains are very specialized computers. What we are trying to do with machine learning is to develop multi-purpose brains computers. So that's the idea behind these long-term plan at some point in time. I realize there will be the need for systematic methods to process oceans of data brilliant. What I found about people who are really smart is that they are able to take a complex set of data in to figure out. What's the one

Should concentrate on because you're right. You have a limited sort of capability to concentrate. You just said wait a minute. This is going to get out of our hands quickly and and I need to concentrate on that and that's that's and now that's changing things. I think it's brilliant computers. We only become more powerful and data will only become more abundant 80% of all the data recorded in history has been recorded over the past two years. So when you go back to Mesopotamia are most of those pictures of people's cats.

It's but it's significant amount. But you know, it's information storing data has become extremely cheap. Yeah, and as a result data will only become more abundant right computers will only become more powerful perhaps In Our Lifetime. We will see quantum computers which are going to change completely what our understanding of what a computer can do. So we are at the point of no return.

Brains will have to be extended. Our abilities will have to be enhanced with with computers. Yeah, you're right then I think maybe frightening the enough Jim Cameron was right with Terminator. So in preparation for our talk, I read your recent editorial in the financial times where you expressed concern that most Financial firms are using the wrong kind of machine learning. I found the piece quite fascinating and thought our listeners would like to hear your view and impact on your vision of the future of TPT.

T when you think of the way machine learning is being applied today, there are essentially two paradigms one is what is very well known by everybody. And that's the Google Paradigm has on Netflix cetera. What they do is they develop oracle's and what is an oracle in Oracle is a machine that learns to detect a pattern from huge amount of data, but there is no real understanding of what

They function behind it or how is this Oracle producing forecasts? These forecasts are the result of a black box.

And that's a commercial application of machine learning. Google is not in the business of understanding. Our brain is in the business of selling as services on the other hand. You have the second Paradigm and that's the way machine learning is used at National Laboratories and universities in this second Paradigm machine learning is used as a tool to develop.

Up fear, he's a scientist has no use for an oracle or a black box a scientist objective is to develop a theory a machine learning is an extremely powerful tool to accomplish that goal. The idea of TPT is to apply this second Paradigm to finance many other firms apply machine learning to finance as a black box and in my view, that's a mistake.

Because it will lead to false discoveries. If you don't understand why a strategy makes money, you will not know when to decommission it when it is starts to lose money. So when it starts to lose money is this just part of the Specter Behavior or has the market learn about this opportunity and it has been Arbitrage away. So unless you have the theory as to why the algorithm is making money you cannot do.

Commissioned it so that is my criticism of the way most firms are applying machine learning in finance that the responsible way to do. It is to apply these techniques to develop theories. And then the theory will make the forecast not the black box amazing. And so it's AI plus it's machine learning plus and yes, it is the the same way that machine learning is used at the National Labs to

applied to finance with the goal of preventing back to sober fit in and false Discovery. Yeah, and this talks back to your concept of this supposed to predicting the weather which follows the natural law. I mean, maybe they'll be an intervention by divine power and that law will change not likely but here we have financial markets where people even are in a pathway of discovery of a something that you machine learning is turned on then they're exploiting in and then it destroys it. You have to be ready too.

Change that Viewpoint & TPT sounds like it's about figuring out how those things are happening and figure out how we can change this this direction of the steering. Let me give you an example. Yeah. Oh May 6 2010 markets collapse in a matter of minutes by about 10 percent relative to the open. This is remembered today as the flash crash. The flash crash had never happened before that's why sometimes you described as a Black Swan, so that's the key difference.

France between the two paradigms of machine learning and Oracle would not have been able to predict the flash crash. Why because the flash crash had never happened before if the pattern has not been observed before it cannot be predicted. Yeah, but let's now think about the second Paradigm the second Paradigm uses machine learning to develop a theory about how markets work how market makers provide liquidity how people response to the absence of liquidity. That is why you see

The second Paradigm You can predict something as a Black Swan even something that has never happened before so in particular on May 6 2010. I was managing a large portfolio of Futures and I was training something like a hundred thousand features a day and two hours before the flash crash. My systems went flat. They flatten the position for first time ever. Wow, and my

team and I we were in the process of looking to the logs of why did these systems shut down the position and then the flash of course, like two hours after our position was was flattened the markets collapse and we were like a standard. Why is this a coincidence? What happened? Well around the bottom the system start to buy and profited from the rally into into the clothes. So this is why this algorithms were able to predict something that they had never.

Seen before because these algorithms had helped us develop a theory about what would happen in any event when market makers abundant the market right when there is no liquidity provider. So what the algorithms realize is when the order flow becomes extremely imbalance you have to stop trading because prices could could collapse or good rally and the algorithm the algorithm stick.

Detected that the order flow was extremely balanced. Therefore. They predicted that something that there would be an increase in extreme event, right? They flatten the position and in fact for us the flash crash was a great day. It was a day where we were able to buy at the bottom and profit from the rally. What an amazing explanation for your vision as a person the company that you built and why it matters it just it's so elegant. I love it. What what is it?

Pickle day like this was an a typical day. What is it typical day like at TPT for you and one of your staff deputies highly automated firm so likely I spend most of my day doing research and meeting with investors and client's understanding their needs and thinking about Creative Solutions to their problems. Sometimes I meet a client and in the course of the first meeting I start to code and show him.

Him or her how an alternative approach would address their concerns? And that's really the true power of machine learning it offers an entirely new way of thinking about problems that circumvents many of the pitfalls calls caused by traditional ways of thinking you can really think about innovative solutions that people have not thought before amazing. This is for younger people to listen to to understand a process of to getting to where you are. What are some challenges.

Is that and some techniques or some ideas that you would give to a young person listening to this to get to the point where you are in your career? I repeat the piece of advice that I received as an undergraduate student dedicate your life and career to something that in retrospect will make you proud. We spent most of our Lives working. So unless your work has meaning your life will be meaningless.

Find meaning in solving a problem that other people have failed to see your address and Find meaning in innovating when you join a firm avoid politics do not compromise your values principles or intellect take risks to not settle for the ordinary and quit your job as soon as your stop learning. Wow. We've talked a bit about machine learning and AI today. Can you please give us your thoughts about it?

Impact and finance over the next five to ten years. It's going to change Finance finance will never be the same. The reason is very clear markets evolve very quickly and the only way to understand the Dynamics of this system is with the complex methods large amounts of data and large amounts of computing power. When you think of the job description of most people in finance 50 years ago,

it has nothing to do with today. And today has nothing to do with 10 20 years ago today students should focus on becoming really good at coding really good at modeling large data sets analyzing data and looking at everywhere in science how other scientists have approach similar problems. Sometimes the problem is similar just in an abstract way, but there is a lot of useful.

You'll dine in other areas like biomedical research or in physics. We're in the Golden Age of fintech today. There are so many problems that have been present for a long period of time. And now finally we have the tools to answer these problems in closing. Is there anything else that we missed about fintech and are about doing a career in fintech that we haven't touched upon. I think the most important attribute of researcher in finance today is to think outside the box the legacy of

approaches have been used for way too long and people have compromised performance for the security of using some technique that was developed 20 years ago and investors need to realize that this Legacy methods do not add diversification do not protect from downside risks and that very little value. They need to be replaced with modern methods. These methods are being used by some of the most successful hedge funds in

Three when you look at the list of the most successful hedge funds in history about half of them are quantitative. Oh, wow. So what it tells you is that Quan methods work very well when applied properly. Yep, and that is why they are these quantitative hedge funds are so over-represented in the list of the most successful hedge funds in history and they are run by people in many cases without a finance background. Why do they succeed because they are very good.

Good at analyzing data. That is I think the most important skill that people will learn at Cornell and at the CFM program in particular and is how can we strike value from data in an unbiased way in a way where we are not introducing our priors and our prejudices in in the data. Well that it's amazing your passion for this your understanding of it. It feels like you're just getting started. So I'm really excited to see where you go with all of this. Thank you very much for your

Time as we arrive at the end of the session, let me mention that for more info you can go to www.hsn.com. The plan is to use social media approaches to provide career insights to Cornell students about the fin Tech sector. We will do this through conversations with Cornell Alum and other presenters across a range of experience. Thank you for listening and please subscribe to the podcast so that you may be ready when the next one comes out.

Podcast #4 Zohar Hod

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology are fintech has we call it fintech is the foundation by being the mechanics from which all Financial transactions take place every day and everywhere. Usually fintech works great goes unnoticed, but it's vitally important. So we're here to shine a light on what most take for granted how Christopher Henze authentic Communications professional I specialize in

Telling the story of fintech for many high-level companies in the sector on this podcast series, we'll hear from alumni and other presenters across a range of experience from recent grads to those with many years in the field today. We are meeting with Zohar hod. Zohar has a leadership role in launching several startups that leverage Quantic knowledge ease and state-of-the-art Technologies to bring innovative solutions to the financial industry. His latest is in the blockchain area, but truly captivating subject for our listeners. So welcome Zoe.

You are okay before we jump into the blockchain topic. Can you tell our listeners about the various Ventures leading up to your current role? Sure. Thank you Chris and good morning to you. Yes. I have worked in the industry for close to 25 years started in the financial industry. I worked for a bank in the beginning as a trader, but then realized very quickly that there were so many inefficiencies and the process that I was using to actually trade so

My first startup was a company called view trade. I started it when I was I think 27 years old and it was really a router to connect at the time 1998 different exchanges around the world in the metals trading space then managed to sell part of that company to another bank and continued on travel to Singapore built an artificial Machine Vision company called our division took that

Lake came back to the United States started working in Consulting a little bit worked at both bearing point, which is part of KPMG and IBM and IBM. I met a few esteemed colleagues from Cornell as well and built a practice around the installation of complex risk management systems such as murex and Calypso that brought me into the derivatives world and the quantitative engineering world and after that I was poached by

The guy named David Gershon who started a company called super derivatives. The intent of super derivatives was to be able to price very very complex instruments that are not liquidly traded from interest rates that affects the commodity credit and so forth since then I've started another company in the interest rate derivatives of world processing world and then recently about a year ago. I joined this company digital asset the holding which is a leader in the blockchain space.

Wow, I'm pretty Blown Away by here because to me they're you know, my resume would be I make movies. Yeah, I guess but an interesting time that's amazing very impressive with each of these Ventures. You have been on the cusp of new Innovations, especially in the blockchain

arena before we dive into the digital assets story. Can you help our listeners understand more about blockchain and what it means to the financial industry sure, I could spend more than an hour or just try answering that question. So I'll try to be

What I think I think people have a theoretical understanding of blockchain, but what's the piece about blockchain that the people who don't don't normally think about what's first of all separate between blockchain and cryptocurrencies. Okay. That's the main thing that I want to send as a message to your listeners. Glad you did the technology behind Bitcoin is blockchain. However, not every block chain needs a store of value such as Bitcoin. So it's really common to see people

Mix those things and when I tell people I'm in the blockchain space. The first thing that they say back to me is what's the price of Bitcoin? It's it's got nothing to do that. All right. I mean it's got something to do with that. But really the area of blockchain is so complex because initially it started as a way to create trustless transactions across trust barriers. What does that really mean in sounds like really complex, but when you think about it every time you transact with anyone

Is a notion of trust do you trust that person and usually we don't and that's why we have intermediaries between us. So when I want to pay David versus Chris, there's usually an intermediary. It's either the bank or the central bank that stands and it's a trusted entity. Well the inventor of blockchain and Bitcoin wanted to do those transfer value would no intermediary. So how do you create a technology that can allow people to have an immutable meaning?

In cannot be changed sets of data, which is synchronized across multiple geographies with people that you actually don't trust or entities that you actually don't trust. That was the real Advent of blockchain. That's really the gist of the database. It's synchronized data and sharing of data across multiple parties both geographically and not without the need to trust each other. Wow, when you explain it that way I get to see the

Power of what it is so you can Mark have information and there's a possibility to add to it and then pass it on. That's that this incredible potential arises from that. That's an absolutely not only that I'll give you a really simple example of blockchain in your daily life. Okay. So let's say you played some football and God forbid you got an injury one was in your leg. The other one was in your jaw. Okay, you go to

the school doctor and supposedly there's supposed to be two doctors that treat you one for your jaw injuries, and he one for the leg injury. Well, if this was a real case, you would have to fill up that 300 Page questionnaire in order to ascertain who you are and what's your medical records and your medical history? Well in the era of blockchain, you would never need to do that again, if you went into two doctors you will need to do it twice and then there's a manual key entry 2.

Sort of a system that sits in the one doctor versus the other voila you now I've got two pieces of information that might be different on the same person, but there's a trust boundary between those two doctors and therefore they can share your data that creates a huge amount of issues as you need to fill up your data again, and again blockchain will solve that issue. They will be only one record that you control and you till your doctor's which part of that record you want.

A share. Okay, that is a great example of how to use blogs what it's a great explanation. Can you now segue a little bit into the mission of digital asset sure, of course, so the mission of digital asset. I've joined the company about a year ago the company started as they wanted to be the number one blockchain platform for years. They've tried to show that there is a fit for the block change platform into highly regulated market infrastructure environments such as exchanges.

We've managed to get the Australian exchange to convert all of its clearing and settlement systems from an old system that was written in Java many many many years ago. Okay, 33 million lines of code, and we've managed to replace the whole system with our own technology and what we realize that we only wrote 55 thousand lines of code. How was that possible that was possible not just because of blockchain which untangles this spaghetti.

A of workflow but also because we invented a language we invented a programming framework which allowed us to code or program. These really complex multi-party workflows in an obstructed language meaning it's a language that if you were not a coder you can actually understand it's based on functional language programming and it's called demo which is digital asset modeling language. And it basically we found that as you move between

I mean centralized siloed organizations that sit in their own Silo into this environment where you as a user have multiple ecosystems that you need to connect to the complexity of these decentralized applications does not fit the current programming languages that exist today and that's why we thought about creating our own programming language to do that. Once we did that we wanted that programming language to work anywhere on any

type of database whether it was blockchain or centralized. I know it sounds counterintuitive to what I just described but yes, there is a situation where you can create agreement between multiple parties, but they don't necessarily each have to have their own data. They could all share one source of data. So it means a decentralized application with a centralized database the biggest issue with blockchain adoption right now is the choice of what's the database and

Jim that you were before databases and you had a hundred choices of databases. Would you build a large-scale application without knowing who's going to be the winner in that hundred party game and the answer is no and that's what's been the biggest barrier to entry in terms of blockchain adoption and the financial industry. It's the choice and maturity of platforms sounds like this some very smart people working here because I always said that it takes very smart people to take complex problems and then to implement sort of

of the simplified genius solution to them and to even take the code and make that simple and accessible and then to make it open. This is quite impressive this company 483 employees has more than twenty five phds working it now. Oh man. So the language was invented in our Zurich office. There is a school right next door Zurich office that basically teaches languages and that's where we got our skills from amazing is blockchain more of a technology and Big Data.

Or does it require substantive quantitative skills, if you have quantitative skills, it will be easier for you to understand the complexities of blockchain. If you have quantitative skills, you can use the technology in a much more meaningful way and I'll give you an example if you're a Quant building a financial engineering product and let's take something that everyone in the your audience will hopefully understand if you already find studying Financial engineering and interest rate swap. Okay, and

Interest rate swap. What is it? And in reality? It's basically an exchange of cash flows in return for certain commitments. Right? Well the way that we've built damle is using something called smart contracts. We came out of the notion that you can describe any legal contract or any Financial instrument in the notion of three simple factors who are the parties to the trade or to the financial instrument or to the workflow. What is the rights and what are the obligations of those?

He's to the workflow now think about it and interest rate swap is an exchange of cash flows, which each party takes either a right or an obligation. If you did that now you could use our programming language. It's called demo again, and it's free download.com and start building complex Financial products using extremely simple business logic understandable code if you had the ability to think of data centralized and old

Artie's share that data Financial engineering will become a lot easier for me. What's fun about talking with somebody like you who so on The Cutting Edge of the ideas is that you know, I'm inspired to one approach look into this and I imagine somebody listening may just have been inspired by it's just absolutely just go to demo.com. There's a startup guide that talks about a an audio you between Alice and Bob try it for yourself and see how easy it is to build financial instruments using Donnell.

I think I'm going to do that. Can you give us your view on the direction of the block chains in the financial industry? Yes. So this is a really interesting question because as I said, there's a plethora of different data persistence mechanisms rather than a database I did that on purpose. It's because there are so many different variations. There are public blockchains that use the ethereum network. There are private blockchains, like kurta are three like what digital asset had like IBM Fabric and so forth. So to say that one is

is acceptable to financial industry or not is really hard. What I do see in the financial industry is that the beginning of blockchain came almost as the technology looking for a problem rather than a solution looking for a technology. So in my opinion if you look at the real applications of blockchain, there are many more applications outside of the financial industry than there are in

the financial industry financial industry came with blockchain first because it thought it would be a golden.

Ticket towards solving the reconciliation issue in the financial industry and again reconciliation happens because of those trust barriers that I described before even within a bank organization where a trade gets multiplied 30 40 times just so each system can consume it that requires massive reconciliation. So yes, there is a great application for blockchain in the financial industry. I think that the nature of the financial industry can change dramatically

with the Advent of blockchain and even the crypto currency Market infrastructure where there's no centralized entity that could be the future of financial industry given the fact there's not been in consolidation on which database is better. There's been a very difficult road to adoption in the financial industry. Some entities are Visionaries and take the first step see broadridge in the United States see ASX in Australia and several others that you'll see some announcement, but generally

It's been a very difficult Road for watching to be adopted in the financial industry because of all those reasons that I mentioned before. Well, I guess it'll ultimately though hopefully reach a Tipping Point because it's one of the things that always surprised me about looking at technology as associated with financial world is that there are some of these incredibly old Legacy things that are going on. They're always surprised me how often you had to go to a Das prompt, correct, you know so Doom by the way, are you still looking so so I've been away from still distilled arm

mainframes that have coughs crumbs around them. Good Lord. All right. Yes. Well somebody who is at Cornell University right now, maybe has never encountered a spark. Well, they probably have I guess but what is some insights that you can give them about how they can find their future and as a considering a career in financial industry. Well the most interesting notion about what I just said and described about blockchain is that in reality? It removes the need for a centralized trusted party where

You could say that a centralized trusted party equals your bank. Right? So the banks have a definite threat over their heads in terms of this new type of Technology. They can, you know, try to resist it. There's a whole adoption curve of how long this would take for these things to get adopted but it's usually get Catalyst by either a regular you are considering replacing Bankers with machines. Like we have the factory worker leave it or not. So yes, it's just in that space and that's

If you have a long-term view of your career, then 20 30 years ago, the banker of today would not be the banker of of that future. And therefore you need to kind of push yourself into areas where your skills as a creative person are needed. I would say one more thing. I think that there's a little bit of a perception that because of these multiple amounts of new brand new technologies that are hitting us at the same time. There's a little confusion or an understanding that we need to choose between

one or another whether it's Block Chain or a i for example Pro one of your previous podcast. It seems like there's a choice should I go in into AI or should I go into blockchain? Should I go into data science or should I going to quantitative engineering the answer is that usually we had one to ecology and then we had a decade to adopt it. Now we have about four or five new technologies all coming to us at the same time and our brains just can't adopt so many new technologies. So I would say relax

Think about all the Technologies they might be complementary to each other. There is newer technologies that are coming like Quantum Computing that would take some time but we'll change the whole database industry as well. Think about how to best work with all of those Technologies rather than to choose one or another very smart and definitely I imagine somebody listening to this is going to take that advice cool. Well great job. Thank you Zohar as we arrive at the end of this session. Let me mention that for more info you can go to

UW, alumni - mentor.com the plan is to use social media approaches to provide career insights to Cornell students about the fin Tech sector. We will do this through conversations with Cornell alumni and other presenters purse a range of experiences. Thank you for listening, and please subscribe to the podcast so that you'll be ready when the next one comes out. Thanks. Thank you.

Podcast #5 Anant Patel, Dong Hyun Kim, Shankar Venkatraman

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology or fintech has we call it fintech is the foundation by being the mechanics from which all Financial transactions take place everyday and everywhere. Usually fintech works great and goes unnoticed but it's vitally important. So we're here to shine a light on what most take for granted. I'm Christopher Henze authentic Communications professional. I've specialized in telling the story.

Be a fintech for many high level companies in the sector on this podcast series. We'll hear from alumni and other presenters Chris a range of experience from recent grads to those many years in the field today. We are chatting with three Cornell Financial engineering Master students who are graduating in a few weeks. Congratulations guys. Can you guys give me your names? I'm Shaun Gordon good ramen. My name is Alan Patel. My name is dong-hyun Kim, or you could just call me th th great. Thank you. We'd like to hear about.

About your experience and thoughts about career opportunities from graduation. So welcome guys. Why don't you start by giving me a little bit of your background and how you arrived in the fintech world. I grew up in India. I did my schooling back in India in Delhi after which I did my bachelor's in chemical engineering followed by a master's in math. After that. I started working with Time Magazine as a marketing and the marketing research team then I joined a start-up where and I was working. I was working in this media startup and

Pretty much doing a lot of things over there being marketing business development building models and following which I did my frm, which helped me get into ey where I was working in the quantitative advisory team and A specialized on model risk and all these things kind of helped me get into Cornell where I am today and I'll be graduating in a couple of weeks. Wonderful. My name is vinod. I actually did my undergrad in Michigan at a school called makes it University. I'm also a chemical engineer and I also have a degree in

Finance when I was in my undergrad, I actually interned at a petroleum company for about four terms and I did operations research work. That is how I got really interested in operations research and I always wanted to apply operation research skills to finance and what is the best field that allows me to do that? So I knew I would eventually want to go into Financial engineering and after my graduation. I worked at Chrysler for a couple of years picked up some data science skill set and Tool development skill set and I decided to apply for

Access program got into Cornell and here I am about to graduate two weeks from now. So that has been a good journey. Yeah, wonderful. So my name is dong young, but you can just call me th again. I'll throw my high school. I was mostly into Robotics and electrical engineering. So when I got into Cornell as an undergrad, I thought I would go for an electrical and computer engineering degree. But I also wanted to explore other options. So I did a minor in business and throughout that I learned this world of finance and I wanted to explore that even further so throughout my

I searched and Cornell. I found out that Cornell's financial engineering program is hosted under the operations research and information engineering school at Cornell. So I switched my major to all Ori well while I was an undergrad and I also got into the master's program for CPAP. And now I'm just like these guys. I'm about to graduate in a couple weeks. Oh congratulations. The one thing I will of note is that you know, you guys are all super smart and each place that you come from you really accomplished something there.

Which we probably started to realize wait a minute. There's more here that I want to dive into and you wound up in financial technology. Why was it more fulfilling was it more something that that really was so robust and accelerating and cutting-edge. What was the reasons why you actually wound up Landing into Financial technology for me was asleep. So I have always been I've been always interested and economics and Finance in general. I mean, I remember having discussions about Finance in my undergrad.

My friends and I absolutely had no idea what they were talking and they would just talk about something in there something complicated and for sophisticated what finance and it took me a lot of reading just to understand what is going on. But given that honest effort I put in I started realizing that this is a fascinating world and I want to actually be a part of it. And once I got my call from Cornell, I thought this is the this is the moment where I could actually break into the industry now, is it is it interesting to apply all of your experience and all of your

Leti into this field which we talk to somebody in machine learning and they're on the very Cutting Edge of machine learning because they have the resources to put into it and also matters. Is that really interesting to you to be a part of that. So for me what I really like about getting a technical degree is you can learn the skill sets and know that these skill sets are going to be directly applicable to any job that you are going to go into in the industry and you get recruited by firms to utilize your skill sets and apply them directly to the tasks and projects.

That they have and also being able to communicate this this technical aspect of the work that you're doing to like higher management or two people in general is very fulfilling aspect of the degree that I'm pursuing and roll. I'm going to take th some of these skill sets are there specific things that somebody who's looking to explore Financial technology that that maybe they have an affinity for that. They should go. Oh I could apply this a financial technology. What you said robotics is your background. What are some skill sets that

Really think lend themselves. So a lot of my first initial programming knowledge came from programming microcontrollers. So that was my first started programming and then when I got to college and taking some programming classes, I learned this world of machine learning where essentially you can train a computer to learn and develop further models by itself and that concept was always fascinating to me. So how do we get to a level where a human can program a robot that can beat other human so that kind of world was always fascinating.

And this world of Finance is also full of uncertainty which is why those two worlds for me kind of merge together. So that's why applying that machine learning with the world of Finance was always fascinated the chance. We were talking to somebody before about machine learning and about the way it works and they're sort of saying that look the machines are getting so powerful and the computers more powerful and is more data to look at that. We're almost getting to a point where the human is going to be the problem. What do you think about the future of humans and machines is it that the humans are

Program the machines to make these great financial decisions our portfolio construction. I don't think that elements of humans is going to go go anywhere. I mean at the end of the day machines are machines machines will do what the human programs machines to do, even though you can talk about artificial intelligence. You can talk about machine learning the advancements of Technologies at the end of the day the models have to make intuitive sense. Let's say someone is creating a portfolio using just the climate data. I mean that person can pretty much Lee come up say say that okay fine. It's going to rain and

Emma okay, ultimately, we should have some equities listed in New York or something which has a completely no relevance to Agriculture and it will still have some sort of correlation and these are certain terms which are human will have to look at interpret the model and we actually able to figure out whether those models make sense or not. So given the diverse range of things machine can do ultimately filtering it down to meaningful useful work. It will come down to a human at the end of the day and now have you done.

Civic internships are work in the financial technology industry as part of your learning at Cornell. So I have done internships not in particular lie in financial Technologies. I actually worked at a bank this past summer working on a trading floor, but I was an analyst and I used to work towards building these Financial models to Value distressed and high yield companies and to find actually working on a training for was that they were was there a moment when you first walked out to it.

You got all this is real or what was that like to be really in the environment for you? So I walked in the first day of octane. It was 6 a.m. It was very very quiet like the floor was empty but there are tons of computer. I've never seen a room like this before in my life. I've seen it on TV, so it was interesting but as soon as people started rolling in then the noise in the background and I was like, yes, I am. I'm in a real place if I had to do it again, I would definitely do it again, but after that I ended up pursuing I wanted to

More on the buy side. So here I am. I'm going to work for a by side firm upon graduation. So have you found a job already? Yes I have and I'm actually working at Bridgewater and I'm going to be a date associate there and I'm going to be doing create a heavy work with implementing Financial Technologies and working with machine learning and model development. In order to use the large sums of data that's coming in from these external sources that these hedge funds by and then making

Making models and making sense of these data sets and implementing them in that investment engine. And eh you have some place that you're going to oh, yeah. So this past summer, I was working at Barclays as a market risk analyst. This is the first finance and just an internship that I've ever had. This world was also completely looted new for me. Just like an on this was my first time in a trading floor apart from seeing it from the movies and TVs. So that was my first experience the work was amazing. They actually even as an intern they gave me some meaningful work that

Hope they still use today. But at the end of the day, I wanted to pursue a more quantitative more machine learning focus more programming kind of focus role. And so now after graduation, I'll be working at American Express as a quantitative data scientists in their model risk Division, and I presume that you are also finding something new or yeah, so during this past summer. I was working with Bank of America and I was working in the alternative modeling group so it so I was working with a lot of coupons and we were not in the traditional

Adding floor. It was more quieter. It was more simply. It was not as puzzling as energy as in think these guys will but it was a nice place to work and I'm going to be joining Bank of America as a full-time position. Also now all these jobs local to New York or in now you're going to be going different places. So I will be in New York. Okay. Yeah sing with me. I'm going to be in Connecticut actually. Yeah. Okay that it's nice. Yeah. I'm looking forward to it wonderful in previous podcast. We've talked about positives and negatives of where technology

Is going and the financial sector machine learning blockchain, excetera. Where do you guys can each give me your view of some things that you see is the future of technology because you're going to represent that you're going to be in that now you're starting at a place but you know as Wayne Gretzky said it's like the reason he's good at hockey is because he skates to where the puck is going. Yeah, right. He does. He doesn't look where it is. So, where do you guys see the puck going? And what do you think about for me specifically if I have to think about certain?

Technical terms here. A lot of relationships in the finance world are nonlinear to say so let's say if you have to price an option the relationship it has with an underlying stock your own which it is priced on. It's an orderly relationship through time people have relied on just the black-scholes framework which are set up in 1970s and the people won a Nobel Prize for that and Traders and even like even today they are relying on those models. We will understand those deficiencies of those model yet. It is used efficiently. A lot of research is going on nowadays.

Still pay you to use artificial intelligence to be able to price options more effectively using the same underlying data using the same constraints what black and scholes used but to be able to get a deeper perspective into how those non linearities behave which we cannot see it intuitively or which the mathematical framework doesn't actually allow us to do right now. So for me one thing I that I see that Financial technology can do in financial sector is implementation of machine learning. I think that is like machine learning curve.

Andy is a buzzword in the industry what I see as the future of machine learning is an intuitive application to not just streamline the process of analyzing large data sets. But also making these meaningful relations between things that people didn't already think of and as we move forward we are going to see some great things being done with a technology impressive and the interviews so kind of add on to what I'm not just said the term that I always think about

That cost benefit analysis, you know, what's the added benefit of implementing machine learning into your strategies? So went while I was at Berkeley that a chance to talk with some of the model risk teams and they always said the same thing in a couple of years ago when they were doing that cost benefit analysis. They didn't really see the added benefits of using like a high abstract machine learning model to implement them to the strategies because they didn't really see that the added benefit might be very minute while the

resources that are put into it is going to be very large. But now as a Trends are changing machine learning is a lot of sell-side banks are now putting more resources into developing their methods, but that's one of the reasons why I'm I chose American Express to work at is because American Express kind of puts itself in the Forefront of all the technology space. So now they're kind of ahead of the game against all the other competitors so which is why I think it will be a very fun place to work at and you know, I think everyone else is also going to catch up to that level in a couple of

Yours as well. So now you're somebody who wants to prospectively be in to find out Shakeology or you're considering as a place to go. Is there a piece of advice that you would give that person who's listening to this that you wanted somebody to give you? Let's say five years ago. So you're talking to your five year younger self any piece of advice comes up from you guys. I think couple of years from now. The norm is for everyone programming is going to be a norm everyone has that basic

Programming skill so, you know make sure you have that fundamental skills. What's going to add added value for you is networking really are you able to have this quantitative mindset this programming mindset and be able to communicate or you know meet other clients or people and communicate your ideas? What is this machine doing to someone else who may not understand the technology and that's going to add a lot of increased value to you know, do any future upcoming students infant tank.

Mystery you need to know how to program I would say focus on like Concepts that are still in there baby face of computer science approach areas of computer science that I haven't been really explored. I think the key Point here to focus at least in financial Technologies is that someone should be able to understand what is going on in the industry also understand the market not just from a newspaper perspective area. Just looking at the whole macro view, but they're actually talk to people which brings me back toward. Eh was talking about just network with people understand what different people are doing what they're actually like facing.

T's in what their challenges are and once you understand that it will open up a lot of avenues where you can always use your own skill to actually make something more robust and like which can be like the next change which the industry needs so glad that when I ask that question you guys didn't respond don't do it, which says that you're pretty excited by the prospect of where you're heading. Thank you everybody as we arrive at the end of this session. Let me mention that for more info you can go to [alumni - mentor.com](http://alumni-mentor.com) the plan is to use social.

Media approaches to provide career insights to Cornell students about the fintech sector, and we will do this through conversations with Cornell alumni and other presenters across a range of experience. Thank you for listening, and please subscribe to the podcast so that you'll be ready when the next one comes out. Thank you.

Podcast #6 Sasha Rozenberg

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology or fintech as we call. It fintech is the foundation by being the mechanics from which all Financial transactions take place everyday and everywhere. Usually fintech works great and goes unnoticed but is vitally important. So we're here to shine a light on what most take for granted.

I'm Christopher Henze a fintech Communications professional I've specialized in telling the story of fintech for many high level companies in the sector on this podcast series, we'll hear from alumni and other presenters across a range of experience from recent grads to those with many years in the field Welcome to our next podcast in the series where we bring interesting stories to Cornell Financial engineering students to help them think about the direction of that career today. We are chatting with dr. Sasha Rosenberg who

His career as a Quant in the fin Tech sector with experience at top-tier institutions as well as several startup firms. The focus for today is to give some examples of typical activities in the life of a Quant so welcome Sasha before we jump into today's topic. Can you give our listeners a thumbnail of the various roles? You've had since getting your doctorate in string theory at NYU. Let's start with your first Quant role at Goldman. Thank you, Chris. Hello everyone as Chris mentioned

My education was in physics. I really enjoyed physics and math and I was quite happy doing that. But then the time between you get an idea to have it executed to have it validated verified. It's a very long time actually. I'm sorry. I can't go beyond that. So you just too impatient to do physics. That's uh Nate's not just about the well in patients in one thing. It's a Pursuit that requires full dedication and

Full passion because initially the lifestyle sucks it right. Really. Yeah and you need to have a lot of passion and you need to keep going regardless of the fact that your life is very different from the life of your peers. So you searched around for another way to apply your intellectual talent and you Discovery and then what was going on while I was in the late 90s, so it's a thousand but due to the

end of the Cold War there was a lot of investment and Sciences because it supported some kind of Weaponry effort. And in order to have good weapon system. You need to have good science not to have good Appliance science. You need to have good fundamental science. So there was a lot of investment and basically I was growing up in the Soviet Union and that was extremely unfree country. And the only people who basically had some semblance of Freedom were

Just because the powers realized that in order to compete they need to have free enterprise at least in the scientific aspects of that. Anyway, close to completion of my PhD or any people who are actually applying their mathematical abilities to developing models and all Street and this is what's called corn. So I started my my first role was at Goldman and started as a traditional Quant developing risk models.

And they did require reasonably good knowledge of math on outside graduate level and the interview itself was pretty grueling. It took me all together 24 hours just for the interview. Yeah, like 24 hours of ingredients like three or four visits and it was basically just solving difficult problems all the time. So they want they want to make sure you know your stuff the three questions that were asked. Do you have experience? Can you

Old and we have a green card back. Then you could ask this question. I hire people I check whether they're trainable. So whether they have the intellectual capacity to be trained and whether they can retain what they learned. Okay, so you ask questions which show the ability to think really and then you ask questions to where they claim that they know the stuff. So if resume says something

and then I'm going to ask question about that something the better know what's there Coleman certainly sends traditional. So you started more traditional the more recent roles. You have been with startups. Can you give us some of your thoughts regarding pros and cons of this path? Sure. My first job was at gone then I tried other big Banks JP Morgan and Morgan Stanley and they are more the same of that than they are different. That's my view. Yeah. My personality is such that I actually prefer different.

I just personally prefer smaller places less defined places with less defined roles conversely a startup has less stability and the institutions have more stability. So for a person who's considering it, it's sort of like what's your personality exam and your personality being more startup. So talk about some startups that you've been involved with. Yeah. So the first started on that I worked for and it was pretty young in terms of corporate structure are joined them in 2007 you just do

Do whatever needs to be done. So I even though I was trained as a Quant that was my work history and they're in this startup. I found myself doing everything. So I was right the models. I was managing the team of coders. I was negotiating with data suppliers. I was presenting to the customers. I was selling reading and writing contract. So it was the whole gamut of things and that was with a very humble named super derivatives.

In that company I made many great people camaraderie that feeling of doing something together and having fun. So you're jump to a start-up fulfilled all your expectations for a start-up the the problem with the startup is so you may have fun, but you may get back you the startup is stuck. Okay, and so what was next so and that's the one I was approached by CME cargo Mercantile Exchange and what was happening there is again after the crisis they complex.

Elves which received really bad name then they said derivatives must be cleared and clearinghouses. They had no idea what OTC derivative rules. So they really didn't have any capacity to do that and they were looking for people to actually build that for them. They hired me to actually build that OTC derivatives risk management function CME is the largest

derivative exchange by the risk that they care in so they really wanted to pursue this OTC derivatives and then they brought me on

And they given the mandate to build risk management there which included many different components certainly. All of it is high stakes a lot of things that are going through that have to you have to get right. Let's jump to where you are. Now what's going on for you now, so let's see me I built this OTC stuff. And as you imagine, it was a start-up mentality a lot of fun and then my boss has retired and he said I want you to take my place. I want to become the cro and cro is a very

Call position so much less startup fund a lot more of like this red tape and bureaucracy and this kind of stuff. So I wasn't enjoying it too much so well, but you need to present itself to actually stop doing that. I did stop and then I tried to startups in one. We were trying to use our knowledge from derivative clearing in order to offer something to help people manage their portfolios. That was good effort. It was just the four of us Mike.

Legs they're my partners. I have huge respect for them. One of them when I was interviewing for my first job at Goldman. He was an MD back down. Anyway, they Niche was not too big and we were a bit late and then my next startup was an old friend of mine from school. We kept in touch for the past. I don't know how many years and then we were bouncing ideas off each other every now and then and then at some point he said look I had this idea and I

Eddie got funding for it. Do you want to do it together? Yeah, so and that was in wealth management offering financial planning Financial advice to people who are who typically wouldn't get it from let's say from advisors. This is such an impressive range of startups of work history and skill sets really makes you the perfect person to talk about types of projects in the a Quant might encounter. Can you give us more insight into being a Quantum some of these?

Projects sure though I can think of a few projects of let's say will increase in responsibility and scope as a young-kwang one cannot hope that one would start immediately working on something which is incredibly sophisticated that involves many people on one needs to learn you start with the looking at what other people did you start with testing? Maybe they start with something that is not so critical.

Well for the company and is encapsulated the smallest manageable just for you to not to make too many mistakes. What I want to bring up. Is that even if in large company, it's really important that people show initiative. So actually after spending some time around and working on the stuff out just to get it going and to and learning how things work. It's really important that people start looking for something that would let them distinguish themselves find something.

Is useful and you might be surprised how much even in structured places personal initiative is actually encouraged. I kept reading academic papers in the area of financial technology and financial models and all that and I found something that I thought was quite interesting to as an

academic paper, but I thought it would be really good to apply this to the problems that we are trying to solve and I developed certain library for that.

And people extremely happy about it. So in other words unlike physics where it's harder to be in the place of doing physics and the lead time to discover something is so long here in financial technology. You studied you had an insight to something and you created something to execute and that it happened right away. Yeah, it's going around the way and people really happy and they want to use it right away. That was impressive. Yeah. That was one of my like biggest shocks that you do something and three months later. It's in the system. Well, that's one of the things that I owe.

Is appreciated about the financial world is that in terms of I look at it because I'm a creative person. I look at it from creativity your creative insights can be tested into the world. And the response is either they work or they don't is there's very little gray area as to whether or not your insight your creative insight is founded and you immediately get the feedback. That's one of the things that appeal to me about financial technology. It does certainly no one asked me to do that. I think this is really what gets appreciated and have many stories actually.

It's a really good friend of mine. He was also walking around and trying things out. That's how you actually make a career. You try something that makes sense that you implement people start appreciating that and then you build on top of that. So now he is an extremely well compensated portfolio manager and the way he actually reach that position is by first he wasn't a large institution and he said I want to try this and see how it worked.

Try and that he gained experience that got him fired in the company where you could really learn that and then it really took off so showing initiative makes a lot of sense and people forget about it in a big company, but this is something that really makes a difference. So as a Quant student the idea is to bring your creativity your insights to the situation. I would suggest then ground them in something that makes sense. But then also work towards executing them because that can actually have a pass.

For you many of our listeners are undergrad students are candidates in the financial engineering master's program for the project. You describe to you feel a doctorate is important get a doctor can be fun. Everybody who doesn't have a doctorate and you're thinking about it just do it. It'll be fun. Yeah, okay, we can continue with it can be fun but it's not necessary for the job. Okay, so you do get maybe bit better understanding of going through periods when

Example certain and like really going through that and executing you get the bit more experience in digging deeper. But where you dig deeper has nothing to do where you will end up digging deeper later. So one of the advantages of getting a doctorate is really is having enough to you and flexibility of mind to be able to change with the changing industry. So, dr. Sasha, yes, what additional insights advice can you share with financial engineering students as they consider a career in the

The financial industry one of the most important things is keep learning like you are in the financial master's program. You are going a lot of knowledge when you get a job. You will also acquire practical knowledge build on the theoretical knowledge that you have.

The Practical knowledge which is going to be very different. What I want to say is that I need to keep developing and learning especially in the environment that is changing so quickly. It is really difficult to be doing the same job after 10 years in the industry expect to reinvent yourself expect to be required to do things that were not something that you learned at school. I basically changed for careers during my

What should I start as a Quant and I was this product manager in a start-up then I was a risk managing cro in a different environment. And now I'm again with startups and doing all kinds of things. So one needs to understand that this flexibility is something that will be required all the time. And now I need to learn probably I need to learn machine learning much better than I don't know. So instantaneously.

Get the feeling from you though that when you consider that you've changed really your focus four times over your career that you have these opportunities to learn machine language that this isn't a burden to this is sort of the thing that says I'm going to go at it today to me. It's a certain type of Personality that succeeds in fintech are the ones that you you don't fear the new you say the new is another opportunity for me to show what I've got and it's a it's an intensity that it's multiple you have. Yeah, right either.

But I think I did good but it's not the only way I do know people who stayed in the same line and they have certain let's say career progression. Oh, yeah. Yeah and they people like that as well. I'm laughing because I'm identifying with you so much because I'm an unconventional as well. So yes for those who are very conventional you can find a path as well as Financial. Absolutely Sasha here is like me where we're wanting to tear everything apart and find out what's underneath it and then put it back together in a better way.

Way anything else you want to add? I think that like being nice to people is underrated and over. Let's say politicized sometimes that and sometimes has made difficult to have like normal relationship by all these corporate stuff that's going on, but I think it's really important. You know, we mentioned that you wound up doing a start-up with a friend from school. And so I know that David gertler speaks a lot about relationships and maintaining those relationships. So being nice to people

Was you're going to have these relationships for a while? Yeah, and it's a for example if you are changing jobs and they are changing jobs keeping the relationship. It's gonna then this relationship are going to carry you through quite a few changes. And if you are slamming your door when you're living then basically you are cutting off all these human connection that you established. I would even suggest those who have to slam the door when they leave didn't do a good job when they were there. No, no not so and and also you

oh, you probably end up spending a lot of your waking hours on the job with this with these people. So you might as well have fun and really establish good human relationship because otherwise it will be very difficult to just go to the same office every day and hate every single step that you are taking their degree. So like what you do and do what you like that seems like a great place to finish up. Thank you Sasha as we arrived at

at the end of this session. Let me mention that for more info. You can go to www.petland.com-mentor.com. The plan is to use social media approaches to provide career insights to Cornell students about the fin Tech sector, and we'll be doing this through conversations with Cornell Alum and other presenters across a range of experience. Thank you for listening, and please subscribe to the next podcast so that you'll be ready when the next one comes out. Thank you.

Podcast #7 Michael Atkin

Hello and welcome to our fin Tech podcast. We hope to bring those who are listening a bit more into the world of financial technology or fintech as we call it. Fintech is the foundation by being the mechanics from which all financial transactions take place every day and everywhere usually fintech works great and goes unnoticed but is vitally important. So we're here to shine a light on what most take for granted. I'm Christopher Henze a fintech Communications professional I've specialized

Telling the story of fintech for many high-level companies in the sector on this podcast series, we'll hear from alumni and other presenters across a range of experience from recent grads to those with many years in the field. Welcome to our next podcast. We bring interesting stories to financial engineering students to help them think about the direction of their career. Today's topic is data management in the financial industry. This subject is a bit different than earlier podcast which focused on the quantitative roles for financial Engineers, but as

we'll hear extensive relevant and high-quality data is clearly a key ingredient for any Quantitative activity in this podcast. We are chatting with Michael Adkins who is a well-known expert in the field. Mike has led several large industry initiatives to create standards and best practices around managing data quality and processes in the industry. He was a leader in the launch and operation of the Enterprise data management Council an industry-wide effort to improve data management. The council has a

200 member firms and over seven thousand participants more recently. He founded content strategies or consulting firm, which help organizations Define and Implement data management programs. Mike is also a principal at Agnes dot AI a London-based firm focusing on Knowledge Graph strategy and implementation. So welcome Mike before we jump into today's topic. Can you give our listeners a bit more detail about your activities in the industry? Well, certainly Chris. I actually have a strange and sordid history.

So I've been the analyst and advocate for data management now since 1985. I concentrated my efforts in the financial industry and on the intersection of regulatory reporting and business value. So this was mostly about content into relationships and what I'll call the data chain of Supply. So it's how data goes from a simple attribute to a contextual business concept as you pointed out I found

The EDM Council as the Big Bang started to recognize that data content was the fuel that drove their business processes. And that's when we realized that most entities weren't dealing with the underlying challenges of data management. Mostly they were just tactically repairing data problems when required and it was during that time when the concept of the chief data officer initially emerged. I was actively involved in the aftermath of

The financial crisis I served on several regulatory advisory committees. I was the two term chairman of the financial research advisory committee at US Treasury. I sat on the technical

advisory committee at the cftc and I was part of the financial stability boards activities on data standards. So it's been quite a ride. I'm now involved with some math technology and knowledge graph which I believe is the key to addressing the

A challenges moving forward what I find fascinating about data is there's so much data available and there's more and more data that's always available. And this explosion in data has occurred just over the last 15 years. Is that true? Yeah. I think it doubles every five or something like that. So we're dealing with a bigger problem, right? There's the volume of data. There's the speed of the data and there's the veracity or meaning of the data.

And all of those things are increasing complexity as we go and that's created the data challenges that we have great and I want to point out to our listeners that we are actually using modern technology. We're talking to Mike you're in Virginia, right? And I'm in New York, Washington DC Washington DC. So our listeners may hear a little bit of break up in the signal, but bear with us, I think that will get all the contents across. So can you elaborate a little bit on the growth of the industry commitment and funding for data management over the last?

Years. So I'd say the growth has been a significant it took a while for data to crawl out of the depths of the back office where it used to live and it took a while for it to separate itself from it. So for a good long time it grew in fits and starts and it was usually some smart Co o who came out of a line of business who looked around and saw efficiency benefits of

managing data as an Enterprise asset rather than within a line of business and find that so fascinating that data was this side thing in a way. It's kind of like if you're in a kitchen the person who makes the stove is the one that decides what's ingredients that the chef gets to use is that that's so we data was traditionally thought of well, of course, you could put it in context, right? So the things that drove our industry were mostly technology-driven right? We went through a bunch of Technology revolutions that were truly significant.

Total productivity for companies from computers and mouse and storage and search and retrieval and all of that propelled the growth of lots of Industries, right data was never understood as being part of that activity. It's only when we were looking at interconnected things and how you go horizontally across processes where the meaning of the data actually became important.

The idea that we're trying to build is to recognize the difference between data as something you process. That's the IT world right choir it store. It integrated distribute it Etc and data that has meaning and data represents precise and real Concepts and we have to make sure that the concepts that are represented by the data are in fact aligned with

Original intent from their source and of course if the fundamental quality of that data is bad then everything your building upon it is going to be bad. If something I ever really thought about but so as you're talking about this is so incredibly important just amazing to me and that's why I love doing this because every time I do it I find something new that I just hadn't

thought about it. So one of the things I learned however is that data itself is rarely bad at least in the financial industry, you know, we're very good at the quality of the value of the data because

It's so important, right? And because we have Financial commitments behind it. The big problem we have is not that the values are bad is that they don't compare and align across processes. So it's really The Silo development that created our problem of data that's been transformed and renamed so that no longer matches. That's now why we're paying so much attention to data because processes are now interconnected and linked so that makes a lot of sense. Can you give some insight?

Examples to what the industry has accomplished as you've been working with it as I think about this Christmas. I think there are kind of four big things that we've learned as we've kind of been pushed by the realities of that interconnectivity that was talking about right? I'm not sure that we've accomplished them but we are making progress. So let me give you those four things. Okay. The first is what I'll call cognition, right? We Now understand that data is actually a

a representation of a real thing right represents a person or a commitment or an activity or some process and those real things have to be shared across components and processes. So I and we have what I'll call a prime directive for delivering Precision about those real things to users so they can put at work.

It's particularly hard in the financial industry where we need to understand and manage complexity. Right we've learned about the importance of managing meaning we've learned now, why data has gotten out of alignment that's recognized that data is everywhere in our organizations or managing it in silos. We align our silos with our applications and we've modified and transform the meaning of

Of the data that drives the software that propels the applications, which is what we want out of this process, right? We all want the application and we just assumed you flip the data switch and the data comes out. So the truth is that we've modified and transformed it I call it tortured it to death to make it work in our narrow vertical but it doesn't work. We try to align it and share it across linked processes. So that's less than number one.

Second lesson is the commitment to governance, you know, the truth about data management is it's relatively straightforward and while it might be complicated and nuanced. It's really straightforward idea. The things that are really hard are areas like organizational management and change management and getting people to behave that's where complexity and Independence really is visible. So we've learned what it means to

To embed data management into our organization. It's a new area of activity. The key was to get all the stakeholders to buy into the problem and understand why it's important enough to become a priority when they got 47 other things to worry about and the big lessons of that were data management requires time and resources and data management requires

collaboration across the organization to do it properly it got to manage that whole ecosystem of it.

The business applications processes operations data Etc. The third thing that we learn was what I call the data manufacturing process, right? It's a complex process, you know data facts are very granular. But business Concepts in finance are complex in order to do data management correctly. You got to manage that whole process. So for example in finance

There are basic concepts like expected loss. Right one of the most fundamental concepts we have for managing risk and it's easy to understand the formulas for expected loss, you know expected loss equals the probability of default times the loss given that default times what our exposure is at that time and while that is conceptually straightforward each. One of those things is an intermediate process and has

Zone supply chain. So if the data is not precise and consistent if the definitions aren't the same if the models have different assumptions if the inputs aren't aligned all of that you're not going to have consistency across the organization. So that's the management of the production and consumption process which is the essence of data management. The final thing that I think we've learned is well governance is critical.

Earnest alone is not going to solve the data problem. It got to fix the data, right you got to deal with the limitations of our relational technology environment this year relational technology celebrated its 50th year I which is a lifetime and it you also have to Align data and technology and business process. Right? So governance is just a mechanism to get people to behave in a consistent way. The real lesson is you got to

Your eye on the ball and the ball is about capturing precise meaning and dealing with the realities of our fragmented technology architecture. Now that's amazing and such great insights in the way. You present them. It's very easy to listen to could you tell me what are some of the key industry data initiatives that firms are now investing in and while you're doing that can you also include an example of a data management initiative that would be of particular interest to Orié students? Yes, I think so. Well, let me let me divide that into a

A couple of Parts the first part about initiative key initiatives is really about standards. All right. I'm going to give the industry some credit for recognizing the importance of getting the underlying principles of data management, right? I am tongue-in-cheek describe those principles as the Holy Trinity of data management, which are identify describe and locate right? Those are the building blocks of

Data initiative. So we've got to identify things right in the financial industry. Those things are instruments and products and entities and transactions believe it or not. Those things were missing and finance the lack of consistency of identification contributed to the Fallout after the financial crisis, right? So then regulators and Banks recognize the problem. They work together to create standards for

Legal entities standards for derivative instruments standards for specific transactions because if you don't have that layer of identity, you can't manage the process right if we can identify it. You can't manage it. We also have to describe things. Right we have to describe things at their most granular level. So we must agree in a shared way on the meaning of those things and that's not easy because people look at

The world from their own unique perspective and some processes are straightforward like in the front office, you need an instrument identifier a quantity a price and a counterparty and other processes can be legally complex like in the back where you've got to allocate and settle and clear and manage restrictions and things of that nature. The problem is of course, we use the same words to describe both things. So,

I've learned or are learning about the importance of semantic precision as data gets passed from process to process. So if you don't agree on the meaning of data, you can't manage it either and then of course, we've got to locate things and we got to know where it exists. We got to know what it is. That's the gift that Tim berners-lee gave the industry with the invention of web addresses and URLs and I are eyes and resource identifiers. So the second part is about

Applications right? So we've learned the importance of connected inventory of Data Systems people processes. If you have a connected inventory of what exists where it resides who's responsible how things are used how it moves across a system how its controlled if you have control over that you can do all sorts of cool things, right and we've learned about

Traveling complexity. So we've learned that the types of risk that an individual Bank cares about not necessarily the same as the type of connected risk that our regulator cares about. So in order to understand the outcome of those processes, you've got to unravel aggregate reports from an individual Bank to its component parts. So that Regulators can feed their models about risk to the whole systems and I think the final

Part of your first question was we've learned overcome inertia right getting a new thing like data meaning embedded into an organization in a significant way is hard. Right? So the adoption of Standards the ability to reverse engineer complexity and the adoption of this data Centric culture. I think are the three biggest steps we've taken in the right direction. That's amazing. Thanks for covering that in such great detail, and it's

Be compelling to hear. I understand that you teach a course at Columbia University and that many of your students are data management practitioners. What issues? Are you hearing from them? Yeah, so I teach the principles of data management in the school of Applied analytics at Columbia and most of the students just like most of the industry think about data as something to process right getting them to understand the data also has meaning getting them to buy into the prime directive.

About trust and confidence because if you trust it, then you can put it to work in creative ways. Like it's that time honored garbage in garbage out dilemma that we all have to deal with if the data isn't precise and comparable than the algorithms that my students care about don't operate in the way they intend. So I'd say Chris that the issues that the students at Columbia have are no different than the issues elsewhere right separate processing.

From meaning both are necessary. They're not the same thing learn to respect the data content at the same time. You're learning how to program in Python and are right. So as you pointed out earlier, it's not so much about whether the data is accurate. But just I guess by the sheer volume of it that you can start to go down some rabbit holes that aren't effective or those rabbit holes don't line up with other things that you're trying to do and then you wind up with mush at the end of it.

You too many ingredients. And so you're concentrating on allowing people to respect the data to lift up our concept of it so that we can utilize it in the most efficient ways and we can concentrate on doing that. It's just it's I think it's amazing work. Just think about it a big organizations have lots of systems. They got lots of proprietary software. They are lots of contextual data. You're not going to manage that complexity by unraveling tens of thousands of tables.

All that have conflicting column names all with different views of data quality where we use foreign keys to join and Link things. We have relationships that all have to be explicit. So the real challenge is for us to understand the meaning of the data is more important than the nomenclature we use to describe it and that's a difficult challenge for people to get their arms around right? That's what they call.

Data culture problem. Yeah, it makes sense because I think early on in the industry. It was just nice to have data in a way and now you're correct in my opinion to pursue the growth of respecting that data so that the more you respect it the more that you're going to get out of it and that requires some heavy-duty concentration. Let me give you a metaphor to make it simple right in in the good old days back in the 80s.

We had service bureaus and monolithic environments where there was only a single version of the truth. Right? Right, because there's only one repository of data and then all of a sudden we have this it explosion and we have PCS that are everywhere and people creating access databases and Excel spreadsheets and all of a sudden processing freedom of the birth of the PC led to data.

It was a publisher and there was no consistency and no standards and no processes to ensure that the Precision of the data was the same across all those processes. Well that says it really well. And so lastly what additional insights advice. Can you share with financial engineering students as they consider a career in data management within the financial industry. So in addition to financial engineering

Students should think about the importance of data engineering. All right, this is the big problem of today and I think the future of tomorrow, right? We are now dealing with what IBM called the veracity of data problem right the meaning and that's coming at us faster and ever increasing volumes to the skill sets that I see being in demand or all related to semantic technology to the

Web ontology language. Lots of people are doing Financial engineering that side of the equation not many people are doing data engineering. Right and we're standing I believe at the precipice of this semantic future the rise of the knowledge graph and we see that happening in every industry. So I think that's where the opportunity lies right for. So forgive me if I'll bastardize the saying but it's no longer go.

Go West Young Man it is now goes semantic young lady. Well, alright. I think you've laid it out. I'm a convert. I really love the sense of getting good data and all the things that you pointed out about data. So thank you Michael. Thank you for those great insights. It's my pleasure. Thank you for caring about data. That's it's the moment and we have to all pay attention to this phenomena. So I have to admit that was before I talked to you. I cared less about data and now I find myself a total of

Advocate of it so you convinced me. There you go. Fantastic great as we arrive at the end of this session. Let me mention that for more info. You can go to www.hsn.com. The plan is to use social media approaches to provide career insights to Cornell University students about the fin Tech sector and will be doing this through conversations with Cornell alumni and other presenters across a range of experience. Thank you for listening, and please subscribe to the podcast so that you'll be ready when the next one comes out. Thank you, and thank you Michael.

For your time. Thank you very much.