SARAH HANSEN: I'm Sarah Hansen. And today, I'm talking with financial economist Andrew Lo, whose videos have been viewed millions of times on our channel. I asked Andrew how he makes a topic like finance accessible to everyone.

ANDREW LO: It's amazing how bad we are as Homo sapiens in managing our finances.

SARAH HANSEN: We also get personal about his own learning journey.

ANDREW LO: I have a learning issue. It's the mathematical equivalent of dyslexia, dyscalculia.

SARAH HANSEN: You do?

And I get his answer to the question, should I use ChatGPT to plan my retirement?

[DRUM ROLL]

All this and more on "Chalk Radio."

Andrew, thank you so much for being with us today.

ANDREW LO: Pleasure. Thank you for having me.

SARAH HANSEN: For a long time, I've thought that if I don't have an advanced degree in mathematics, that I probably don't have a place in finance and probably shouldn't be thinking about it much. But I'm wondering if you might prompt me to think differently.

ANDREW LO: Well, not surprisingly, I have a very different perspective as a financial economist. Someone once said that, to a person that has a hammer, everything looks like a nail. And I'm guilty as charged. I learned early on in life that virtually everything, at some point or another, ends up being about money. Particularly with regard to any kind of innovative pursuits for entrepreneurship or career-wise, at some point or another, you're going to have to deal with money. And then you need to speak the language of finance. So that's what really motivated me to learn how to speak that and then ultimately, be able to develop new words and sentences in that language.

SARAH HANSEN: Yeah. It is a new language. And it seems like it's something that everybody can learn, no matter where they're starting from.

ANDREW LO: Absolutely.

SARAH HANSEN: You've contributed to OpenCourseWare. Your videos have been watched millions of times. And you seem really good at making finance accessible to people, no matter where they're starting from. I'm wondering what it is that you do that allows that to happen. Have you done any reflecting on that over the years?

ANDREW LO: Well, first of all, it's a great honor to be part of OpenCourseWare. And the fact that it does reach people all around the world, regardless of cost or access, is really wonderful. And the reason that I was so pleased and honored to participate in that is because I really feel like everybody should have access to this knowledge, at different levels, of course. But we all need to know a little bit of finance.

And I think that early on, I was really drawn to this field because of how impenetrable it was, and at the same time, how important it is. Growing up, I just remember always hearing my mother talk about finances and some of the challenges that we were facing. And I think that really made me hyperaware of the fact that it's really a necessary part of life-- sometimes, unfortunately, too much a part of life. And if we don't understand it, it's very easy to end up being taken advantage of or not being well prepared for the kind of things that finance helps you deal with.

SARAH HANSEN: Yeah, I think about this a lot, when I go to the grocery store and see cereals for over $6 and eggs sometimes up to $8. What are some theories of modern finance that everyday people like me could apply or think about when I'm faced with those situations?

ANDREW LO: Wow. Well, there's a whole bunch of ideas and important notions that we can use in our everyday lives. One of the key notions is that there's a trade-off among everything that we do and everything that we purchase. Far too often, we tend to compartmentalize. And we have a mental budget for certain activities, as well as other budgets for other activities. And we don't allow them to mix.

But sometimes, if you can think a little bit more broadly about the fact that we have a given set of resources, and we have to allocate them across lots of different activities, and there are interesting financial ways of making those decisions, we can actually come up with better outcomes.

One example that I think most people are aware of is borrowing money to buy a home or buy a car. That is basically moving money from the future, our futures, to our present. We're borrowing. And sometimes we need to put money today aside for our kids' college fund or purchasing a car in the future. That's an example of moving money from today to ourselves two years from now or three years from now.

So this notion of being able to move money around and making sure that you don't lose a lot of it in the process is part of the language of finance. And that's something that all of us can benefit from.

SARAH HANSEN: Yeah. It's so interesting, the idea of having more flexible understanding of your resources and how they might move across categories.

ANDREW LO: I mean, I think, at the heart of it, it's really all about control. But I think not enough people understand how finance works so that ultimately, it ends up ruling their lives, as opposed to allowing them to use finance to achieve the kind of goals that they really want.

SARAH HANSEN: So, Andrew, before the show, we asked you to respond to a question, which we will now reveal the answer to. So the question was, should I, Sarah Hansen, use ChatGPT right now to plan my retirement? What's our answer?

Not yet. OK. Please explain.

ANDREW LO: Not yet. Not yet, because large language models are not yet ready to be able to do delegated financial decision making for us. Turns out that saving for retirement is one set of activities. But then spending while in retirement, that's a whole different set of activities. And many of us have become good at saving. But we've been such good savers that we forget that at some point, we need to spend.

And we have to spend at the right rate, for the right things, at the right times. So what my colleagues and I are trying to understand now is not only what those optimal decisions are-- I think we now have a lot of information about that. There's been a lot of research done on that.

But the more challenging issue is, how do we communicate that to people who don't have any finance background, and moreover, can't afford to hire the financial advisors that some of the higher-net-worth individuals have access to? So we're working on an AI solution, an AI financial advisor, that can satisfy the most important criterion of financial advice that regulators impose, which is something called fiduciary duty.

A fiduciary is somebody who is appointed to help you further your goals, will look out for your best interests, above and beyond their own. And so, very often, people get a little bit concerned about financial planners and other people in the financial industry because they don't want to be taken advantage of. And there are many good financial planners out there. But not everybody can afford one.

So the question is, can you-- for those people who can't afford financial planning and for the financial institutions that don't want to spend their resources on financial advice to those who aren't going to generate enough commissions for them-- for these people, can we come up with financial advice from an AI platform that satisfies the definition of a fiduciary, some program that you can trust to look out for your best interest?

We're not there yet. However, I believe that everybody should use large language models to help them think through retirement issues more seriously. For example, ask ChatGPT, what are the biggest issues that I need to focus on for my retirement? How much time do I have? What kind of ideas, and products, and services should I make use of? How do I get better financial information? How do I learn more about these problems? All of those things, I think ChatGPT can do a pretty good job at. But I wouldn't let it make your decisions for you.

SARAH HANSEN: Real question for you. I know, a lot of times, when I put in a prompt that's within my domain of expertise, some of it will be good, but some it's kind of garbage and not all that accurate. So as a person who doesn't know finance, how do I know I can trust the answers that are coming back, even about those general type of questions?

ANDREW LO: Well, so that's really why you need to have additional time and effort employed in thinking through these issues, not just by yourself, but with friends and family. So we need human support for thinking about how large language models can work, either well, or in some cases, not so well. And in any case, if you are planning for your retirement, at some point or another, you're going to have to engage with people from the financial institutions. They will be able to help deal with some of the so-called hallucination problems with these large language models.

But the answer is like anything else that we do. How do you know that your doctor is always giving you the best information? Doctors are very highly trained, but they do make mistakes. So get a second opinion. Get a third opinion. Talk to your family members. Ultimately, you're going to be responsible for your own decisions. But the more informed you can be, and the more you can check the accuracy of the information-- and that information can come from humans or from chatbots-- I think those are the ways that we've developed for making sure that we make the best decisions possible to get a better handle on this.

SARAH HANSEN: Right. And I assume part of the idea would be to start this in your 20s, if you can. Start learning and start using these applications to really begin to save.

ANDREW LO: Exactly. Many people don't realize that the decisions that they make early on can have just tremendous consequences 30, 40 years from now. We now know that about health. We know that if we don't eat right, even as a teenager, we can affect our health when we get to middle age.

The same thing is true about our finances. If we make bad financial decisions early on, it could end up having repercussions far beyond what we typically are able to measure. And so that's really the purpose of having some kind of support, some kind of advice that can actually look 40, 50 years ahead of a teenager.

SARAH HANSEN: It's kind of interesting, because at least in the US, or at least in the cultural circles in which I grew up, it was sort of taboo to talk about money-- how much you make, how much other people make, how you're budgeting. Have you found that in this context?

ANDREW LO: Absolutely. And that's actually one of the reasons why you want to have a fiduciary. You want to have somebody you can talk to about your deepest secrets, your financial goals, your constraints, the concerns that you have about losing your job or not being able to find a job, and be able to get honest advice about what to do about it.

Many of us have good friends that we can rely on for that. But if you don't have a friend who has financial expertise, what do you do? So the hope is that maybe a platform, a reliable AI platform that is able to serve as a fiduciary, can really help individuals with all of their concerns.

SARAH HANSEN: Yeah. That's going to be a game changer for sure. What are some of the dangers, pitfalls, or challenges that might come with leveraging AI to give financial advice to people who do not have financial expertise?

ANDREW LO: Well, any great tool can easily be abused. And I think we have to worry about the fact that if we have a financial planning tool that is AI driven, can that be abused? What if we were to ask this AI to engage in illicit activities for our financial betterment? Is that something that we should be able to do? Or is it something that the AIs should guard against?

You get into all sorts of tricky ethical questions about how these tools are used. And so I think that those of us who are developing the technologies really require spending more time thinking about the ethical dimensions. That's not something that you typically focus on in your research. But for us now, given how far AI has come and what it can do, we have to be much more proactive about thinking about these unintended consequences.

SARAH HANSEN: Yeah, and just how fast everything is changing. The technology is so fluid and so fast, and honestly, not all that transparent most of the time.

ANDREW LO: Yeah. That's a concern that I think most people don't really appreciate yet. It's true that there's always been technology that has made advances, and as a result, has created winners and losers. When the horse-drawn buggy gave way to railroads and then eventually to automobiles, people lost their jobs. And people had to be retrained.

But there is a big difference between that technology and the current set of technologies. And it's exactly what you said. It's about speed. The fact is that right now, AI is moving at such breakneck pace that within a very short period of time, we can actually have large parts of our population unemployed. And the hope of retraining them in time for them to make a difference for their lives can be very challenging, given how quickly things are moving.

So I think that's the one concern that AI researchers are thinking about. We don't have any good answers yet. And one of the answers that's been proposed, which is to slow down the rate of progress-- that's almost never possible. Even if you want to do it, even if you have legislation, there'll be people that will refuse to abide by that, because legislation is not going to stop that kind of innovation. It's not going to stop people from having ideas and wanting to implement them.

SARAH HANSEN: Yeah. The idea of people being put out of work with the advancement of these technologies is hugely concerning, and I know one that you're concerned about, because it seems like, in everything you do, it all comes back to people and the impact on people. I'm wondering where that drive comes from. Where did your interest in leveraging finance to positively impact people's lives come from? Because it didn't have to. There's a lot you can do with money and not worry about positively impacting people. So tell us a little bit about that.

ANDREW LO: Well, yeah. I have to say that that was really not something that I had planned. Much of my early career was focused on applying mathematical and statistical models to investment problems, developing trading strategies, risk management policies, various kinds of systemic risk measures. It was really all geared around the amazing impact that this technology could have on the field itself, on finance, making finance better.

And in some of the things that I did in practice on the commercial side-- started up my own asset management company and ultimately implemented some of these strategies for various kinds of hedge funds and investors. And at some point-- I mean, it was very satisfying. But at some point, I started to wonder whether or not this was it, this was what I was meant to do.

And around that time-- it was about 20 years ago-- a number of friends and family all developed cancer at the same time. Within seven years, six people close to me all died, including my mother. I'd really never dealt with death up close and personal before that. And so it was a big wake up call, and through that process, realized that finance plays a pretty big role in cancer drug development.

I was pretty naive at the time. I just thought that if there was a patient in need, and there was some great technology that could help that patient, that somehow, magically, money would just come sprinkling down and develop the drug. But when I looked into it and talked to my colleagues here in Cambridge, it became very obvious to me that that was not the case, that there were many examples of good drugs that could help lots of patients that will never, ever see it to market because there was not enough financing to bring that to the patients.

So that's when I started thinking about how finance could play a role in that. And it was actually totally selfish. I wanted to figure out how to help my friends and family and how to get better drugs to them. But in doing so, it just made me realize the power of finance and the responsibility that we have, given that we understand the kind of things that other people don't about how to finance certain kinds of projects, about how to bring money to a particular area and really make it go faster, that we also have a responsibility to take some of these ideas and implement them for those really high-impact, high-societal-impact kinds of pursuits.

So I started with that. And then one thing led to another. And I began thinking more broadly about how finance impacts society in general, and realizing that there are many things that we can do to further all sorts of different goals-- climate change, energy transition. There are so many different issues that really are crying out for new business models and financing strategies. And these are well-known tools that all financial economists know. But we haven't really spent time thinking about the applications. So that's been a really rewarding aspect of my current focus.

SARAH HANSEN: Yeah. Could you give an example of how a different business model might radically change the climate trajectory that we're on?

ANDREW LO: Sure. Let's talk about energy transition, because clearly, we are not in the process of transitioning very quickly.

SARAH HANSEN: That's right.

ANDREW LO: In fact, right now, about 82% of the world's energy usage is in the form of fossil fuels. I think that might be down from 83% or 84% 10 years ago. It's not enough. And we're not making a difference fast enough. A number of people who know a lot more about the issues than I do have said that we're not really, right now, in the business of transitioning, because it's not as if we're declining our usage of energy. If anything, it's growing. So what we need to do is to come up with new sources of energy, energy addition, as opposed to energy transition.

SARAH HANSEN: Oh, that's interesting.

ANDREW LO: And so what do you do with that? Where do you go? There are three totally green sources of energy that my colleagues tell me right now that are not in the renewable space. Obviously, solar, wind, hydro is important. But they're not always there when we need it. We need to develop better battery technologies. And that's all happening. That's good, but again, not enough.

So if we want to speed up the process of energy addition, we need new sources of green energy. And there are three. There's nuclear fission, nuclear fusion, and geothermal. And all of these should be areas that we pursue. And so imagine if we could support all sorts of different investment projects in all three areas and really make a concerted effort to develop these new sources of green energy.

That's an example of what finance can do. But we need to develop the political will to be able to do that. And even part of that can be hastened by finance, because if you can show that governments can actually save money in the long run by investing in these, if they can get a good rate of return on these investments, they're much more likely to be able to write the checks that we need now.

SARAH HANSEN: Yeah. It really does all come down to money.

ANDREW LO: Unfortunately, in most cases, that seems to be true. But fortunately, the world has become wealthier. And largely, that's happened because of industrialization and the innovations in technology that we have pioneered. But the wealth is not equally spread. There's definitely winners and losers. And I would argue that the wealth is not necessarily being allocated in the most efficient way. If we were to change some of that allocation, we could actually get better outcomes for everybody. Nobody has to lose.

SARAH HANSEN: So it all sounds so logical when you explain it. But then you introduce humans. Talk to me about humans.

ANDREW LO: Human behavior is one of the most interesting and most confounding aspects of what I do in finance, because we can write down all these wonderful equations that predict various kinds of opportunities for financial investments. But at the end of the day, you're talking about people. And people can react. Sometimes they can overreact.

For example, during the pandemic, the stock market lost something like 30% in a matter of a few days. And if most of your retirement is tied up in the stock market, that was a really big hit. So a number of people responded by what? By pulling out their money from the stock market, putting it in cash.

That, in and of itself, is not necessarily a bad decision. The problem is that many of these individuals, they took too long to put the money back into the stock market. And they missed the rebound, which actually happened just a few weeks after that 30% decline. The market went right back up.

And if you had taken a vacation between middle of March 2020 and middle of June 2020-- if you had taken a vacation and done nothing, you would not even have noticed that the stock market moved. It just went down and then back up.

So I think that understanding these kind of dynamics is important, because we often allow ourselves to engage in behaviors that can be really counterproductive. And that's part of what I do as a finance professional, is to understand how human behavior factors into this. And it's amazing how bad we are as Homo sapiens in managing our finances. And that's one of the reasons why I do what I do. And I'm really excited about it.

SARAH HANSEN: Yeah. You have a hypothesis. What is it called?

ANDREW LO: So my hypothesis is the Adaptive Markets Hypothesis. And it was developed in contrast to one of the most popular theories in my field, called the Efficient Market Hypothesis. That's a theory that says that markets, always and everywhere, reflect all available information. And that means that the prices that you see are generally correct.

And it turns out that the efficient market hypothesis is not wrong. It actually works most of the time. But it's not complete. It doesn't work all the time. And for the times when it doesn't work, where human behavior overwhelms the rationality that you typically see in the markets, that's where you need to understand how the mechanics of human behavior interacts with the beautiful logic of financial markets. That's the adaptive markets hypothesis.

SARAH HANSEN: Yeah. So as a fellow human, what can I do to counteract my own irrational tendencies?

ANDREW LO: Well, the first step is to recognize that this is an issue. So if you recognize that we all have this problem, that's the first step in recovery, in trying to understand how to deal with it. The second step is to do scenario analyses in our brain.

One of the most magnificent gifts of human evolution is the ability to engage in abstract thought, in hypotheticals. We can hold in our mind all sorts of "what ifs." Of what if I decided not to go to work today? What would happen then? What if I decided to become a doctor, a lawyer? What if I decided to save money so that my kids can go to college? Those kinds of "what ifs," we can often work out in reasonable detail in our heads and then pick the "what if" that is the most attractive.

So right now, if we're not in the middle of a financial crisis, we can do "what if" and say, what if it turns out that the stock market crashes by 20%? Given my age, given the likelihood that it's going to come back, because based on the last hundred years of history, when the markets go down, eventually they go back up-- it takes a while. But we can actually see when things are recovering.

What if I decided not to sell out everything? What if I decided to wait and see how things go? What if I were to wait two years, three years, five years? Can I afford to wait? By doing those kinds of "what if" analyses, we can go a long way towards preparing for these kinds of events. And this is where financial planners are really helpful. They have a lot more sophisticated "what ifs" than you and I might be able to come up on our own.

And there, I think, we can get AI to play a role, because AI now, with large language models, are remarkably good at coming up with all sorts of interesting "what ifs." And so to be forearmed is to be-- to be forewarned is to be forearmed.

SARAH HANSEN: We have a lot of YouTube comments pointing out that you tend to make finance very accessible through your lectures. And I'm wondering if you could articulate what it is you think you do that opens the door for students in your classes and around the world when they watch your OpenCourseWare videos.

ANDREW LO: Well, first of all, thank you for that observation. I'm really humbled and grateful for that. If that's true, it's because I often develop my lectures with an eye towards being a student myself. I was a high school student in New York City at the Bronx High School of Science. It's a school that specializes in STEM, and a wonderful education that money didn't need to buy because it's public school.

And I learned more from my classmates in Bronx Science than I think I did from any other time in my educational career. It's a phenomenal school. But one of the things that I learned from Bronx Science that wasn't quite right-- and this is my own fault-- I identified intelligence with STEM.

So if you were smart at Bronx Science, that meant you were good at science and math. I mean, we had history, English, social studies, all of those other fields. But those weren't the real focus of the kids that went there. You went there because you wanted to study science, math, and engineering.

And it wasn't until I got to college that I was completely disabused of that notion. And it happened because I met somebody who was completely innumerate. I mean, he wasn't even able to take the introductory math class in college and needed my help to get through it. And so I would tutor him every once in a while. And he would eventually learn. But it took him a while. And it was never easy. He really sweated it out, and ultimately, I think, passed with a C or something.

SARAH HANSEN:	I may or may not have been that person, but go ahead.
ANDREW LO:	Well, the thing about that person is that he was one of the smartest people I ever met in college. And I didn't expect that. And let me explain what I mean by that. We'd be sitting at dinner. And no matter what the topic of conversation was-- politics, religion, music-- anything that you would talk about other than mathematics, he was just incredibly well informed, articulate, and extraordinarily analytical.

And so that really threw me for a loop, because again, analytical, math, but not in his brain. So he ultimately went to law school, became a very, very well-respected attorney. And he could argue anybody into the ground because he had a mind sharp as a razor blade. How is it possible that somebody could be so smart and yet innumerate? That was a big wake-up call for me. And it pointed out the fact that there are different kinds of intelligence.

So up until recently, when we think about artificial intelligence and computation, it's all computational, quantitative. For the very first time-- and this is why I think large language models are such a breakthrough-- we are now confronted with a very different kind of artificial intelligence.

This is intelligence that is like my friend in college. It becomes analytical, but in a way that uses language, not numbers and equations. And so I think that large language models is a different type of AI than what we're used to. That's what makes it so powerful. But it does have some weaknesses, just like my friend, who, if you asked him to prove a very simple theorem in calculus, he'd sweat bullets doing it. But he was incredibly intelligent in other ways.

And so I think that opens up all sorts of new insights for me in terms of my own students and myself, and how we think about intelligence, and sometimes how limited we are in thinking about intelligence. We measure intelligence with tests, reading comprehension, vocabulary, and mathematical problems. But I wonder if there's many forms of intelligence that we are not capturing with those tests, and there are whole swaths of society that we have somehow neglected and underappreciated because they have an intelligence that we don't know about, we can't measure, but we really could benefit from. |
SARAH HANSEN:	Well, I couldn't agree with you more. I used to be an elementary school teacher. So I saw the ways in which schools pinpoint intelligence, and measure it, and leave out large groups of people. So we're on the same page there.
ANDREW LO:	Well, speaking of elementary school, that was one of the important and formative experiences of my life. It turns out that, in retrospect, I have a learning issue. It's the mathematical equivalent of dyslexia, dyscalculia.
SARAH HANSEN:	You do?!
ANDREW LO:	Yes.
SARAH HANSEN:	Wow. That is so surprising.

ANDREW LO: Well, people say that because of what I do now. Yeah. But it was definitely the case that math was my worst subject. And for an Asian growing up in New York City in the 1970s, that was not easy.

SARAH HANSEN: Wow.

ANDREW LO: So it wasn't until I went to the third grade that I finally found a teacher that recognized something in me, Mrs. Barbara Ficalora, third grade, PS 13 in Queens. And she knew that I was struggling with math. But yet, she also saw that I was really curious. I would always enjoy going to the library. Once a week, I would take out a stack of science books, and read them, and be really interested in that.

And so she tried to boost my confidence by making me the class scientist. Now, I didn't know that that position existed. I certainly didn't apply for it. But what it meant was that I got to demonstrate one of these science experiments that I was concocting at the back of the room every free period I could get, and just talk to the whole class about how to make a battery out of lemons and magnets.

And I think it was that experience that allowed me to get through my elementary years, despite the fact that other teachers that I had who were not so supportive-- were pretty discouraging to me and to my mother. Back then, there was no diagnosis of ADHD or dyscalculia. So, I basically soldiered on until I went to high school at that Bronx High School of Science I mentioned.

That was in the 1970s, when New York City was undergoing this radical experiment called the New Math. I don't know if you've heard about that. But it was a widely renowned failure, because it was replacing the basic concepts of algebra, geometry, and trigonometry with all these mathematical concepts of groups, rings, fields, isomorphisms, and other transformations.

And while, mathematically, it was more rigorous and intellectually more pleasing, most of the New York City school teachers were not prepared to teach in this way. And so, for most schools, it was really a failure. But for me, it was night and day. I came from being a C student in math to an A student overnight.

SARAH HANSEN: Because it was more analytical and less focused on--

ANDREW LO: Numbers. No numbers. To this day, I have a hard time memorizing numbers. I never memorized the multiplication tables. I still have trouble with 6 times 7. I have to actually do the calculation in my head. And it takes me a little bit longer than most people.

But when you replace numbers with equations, that was like a huge relief. It's like wearing shoes that are two sizes too small. And then you take them off, and you put on shoes that are just exactly the right size. It felt wonderful.

And because I struggled as a student with my own learning issues, I could tell the difference between good teaching and bad teaching. And of course, for a while, I blamed it on myself. But then, once I learned a bit more about my own learning issues, I began to understand what certain things would allow me to see a concept versus other things that would confuse me.

Now, when I write my lectures, I often have to step into the student's role and ask myself, if I didn't know anything about this, what would be the fastest way to get me to have some kind of a grasp of what it is that I'm trying to teach? And again, looking at it from my own lens.

The other part is that I've had the great gift of having a number of really incredible teachers. When I was a high school student, my calculus teacher, Mrs. Henrietta Mason, was amazing. When I was a college student, Saul Levmore, Sharon Oster, Herb Scarf, amazing. As a graduate student, Andy Abel, Jerry Houseman-- I remember all of these teachers' names. It's because they just made a huge impact on me. They changed my life.

And so part of why I spend time on teaching-- and I think this is another aspect. Some of my colleagues are so focused on research that they feel like they can't afford to spend time on teaching. But because I remember what it was like as a student when faculty didn't take the time to try to explain something in a way that would be more understandable, I decided to spend the time on working on my lectures.

Someone once said that great writing is not writing so that other people can understand. It's writing so that other people cannot possibly misunderstand.

SARAH HANSEN: Oh, that's a good one.

ANDREW LO: Yeah. That's a very difficult standard to adhere to. But I think that's the same with teaching. Teaching is lecturing so that students cannot possibly misunderstand. And that does take a little bit more time. But when you are able to land a concept with an audience, there is no better feeling, from my perspective. It is like, I don't know, gymnasts hitting a perfect landing, ice skaters being able to do a triple axel without falling.

For me, that is just an incredible feeling, a rush, that I can communicate something that somebody didn't understand. And now their faces light up. And I get it now. And they will forever-- from that point, they will forever have that to use and to benefit from.

And also, one of the things that makes me particularly grateful to OpenCourseWare is that it is the great equalizer. There are so many people that can't learn on a schedule and that have all sorts of issues that don't allow them to excel in a classroom with 30 other kids. And yet they're perfectly intelligent, in some cases, super intelligent. But they have these challenges. OpenCourseWare gives them a platform, at least, to be able to learn at their own pace, to be able to stop the video, to think about it, to start it up again when they're ready. And there's nobody looking over their shoulder, seeing how well they're doing relative to their competitors.

It changes the learning field, and I think, gives opportunities that weren't available. So I can't tell you how honored I am to be part of this, and to be part of the institution that came up with this platform, and basically gave knowledge away to the rest of the world.

SARAH HANSEN: You brought something with you today.

ANDREW LO: I did. So when I was asked to come on this program, you asked me to bring a meaningful memento, something small that I can carry. And I have to tell you, that was a terrible assignment. It took me a long time, because I-- what should I bring? Little art objects that my kids made that are dear to me, my high school diploma? But I decided to bring the most important reason for where I am today. And this is a picture of my mother.

SARAH HANSEN: Oh, lovely.

ANDREW LO: So I mentioned that we grew up in New York City. We were a single-parent household. She worked one job with overtime to be able to raise three kids by herself-- I was the youngest of three-- and instilled in me and my brother and sister a love of learning, and the importance of hard work, and focusing on the longer game as opposed to short-term issues, which is ironic, because most of her young life as a mother was focused on trying to make ends meet.

I would remember conversations about finance pretty much every single month. And it was tough, because we did not grow up with a lot. And she was divorced. And that was a time when it was very difficult to survive as a single woman with three kids. But she did an amazing job. And so I owe her a lot.

SARAH HANSEN: So if she was here with us now, what would she say to me about balancing the ends meet with the long game?

ANDREW LO: Yeah. Well, I don't know that her advice would be something that anybody would or could do, because she sacrificed her career for us. She was a lawyer by training, left China when the Communist Revolution took place, then married someone who was not ideal, an abusive husband, took a long time for her to see that and get divorced, as she did. It was a very messy divorce.

And because he was a foreign national and ended up being a diplomat, he was also-- the best thing about that marriage was that he was an absentee father, because he was abusive when he was around. And so she dedicated her life to her kids and held a menial secretarial position, despite the fact that she was educated in law from China, and ultimately, I think, really put the three of us through school so that we could have the careers that we do now.

I don't know that that's the right advice in general for women that are in that position, because I think there has to be more of a balance. But for her, it was just really important for her kids to reach the career goals that she set out for us.

SARAH HANSEN: What's her name?

ANDREW LO: Julia Yao Lo.

SARAH HANSEN: That's lovely. Thank you. Thank you for being here. I really enjoyed getting to know you. And you've completely changed my perspective on what's possible in terms of my relationship to mathematics and to finance.

ANDREW LO: Good. I am honored to have played that role. Thank you.

[MUSIC PLAYING]