EP.170 Amitabh Varshney

Narrator: You're listening to *BioTalk* with Rich Bendis, the only podcast focused on the BioHealth Capital Region. Each episode, we'll talk to leaders in the industry to break down the biggest topics happening today in BioHealth.

Rich Bendis: Hi, this is Rich Bendis. I'm your host for *BioTalk*, a podcast focused on leaders in the BioHealth Capital Region nationally and globally that are committed directly or indirectly to our BioHealth industry. And I'm pleased to have today an individual who is leading one of the leading computer science departments in the world at a leading academic institution. And he's going to educate our listeners on everything that the University of Maryland does around computer sciences. We're fortunate to have Amitabh Varshney, who is the dean of the College of Computer, Mathematical, and Natural Sciences, and also a professor of computer science at the University of Maryland in College Park, Maryland. Dean Varshney, welcome to *BioTalk*.

0:01:07

Amitabh Varshney: It's a pleasure to be here, Rich.

Rich Bendis: Well, I'm really excited to do this because we have a jewel that a lot of people are not aware of, and you're going to educate them about all of the assets and resources and capabilities that you have at the University of Maryland, and being the dean of this exciting department that's emerging to provide technology and services around the world. So, before we start about what you actually do in the department, I think everybody would like to learn a little bit more about your personal background. And, rather than me do that through your vitae, which is very lengthy, we're going to have you do that for our listeners yourself, Amitabh.

Amitabh Varshney: I would love to, Rich. So thank you so much, once again, for inviting me on your podcast. So I started in India. I went to the Indian Institute of Technology, Delhi, with an undergraduate degree in computer science and engineering.

0:01:58 Then I arrived in the USA, University of North Carolina, Chapel Hill, where I did my MS and PhD in computer science. And one of the topics I did in my PhD was on finding solvent accessible surfaces for molecules to

enable studies on protein folding and therapeutic drug discovery. After that, I joined the State University of New York at Stony Brook, and I came to the University of Maryland in 2000. And I've been here since then, close to 25 years now. And I have been a professor of computer science, director of the University of Maryland Institute for Advanced Computer Studies, an interim vice president for research, and now the dean of the College of Computer, Math, and Natural Sciences. And it has been a very exciting journey. University of Maryland has been an absolutely fabulous place, both for my personal life as well as my professional career.

Rich Bendis: Well, congratulations on your journey. Very successful. And one of the things that's helped make you a success is I've had the privilege of having two of the chancellors for the University System of Maryland on the BioHealth Board.

0:03:03 That's Brit Kerwan—unbelievably visionary—and now I have Chancellor Perman on my board, and what leadership you've had the ability to work with in the University of Maryland System.

Amitabh Varshney: Both of them are just amazing individuals and leaders. I couldn't be prouder to be associated with them as a colleague of theirs. And they are so full of energy, enthusiasm, and vision. It's been really amazing. How lucky could we be to have them as our leaders?

Rich Bendis: Well, we're both thankful to have them. But let's talk about what you've been able to do, and how you've been enabled to actually grow the College of Computer, Mathematical, and Natural Sciences. And so let's introduce the college to the listeners, please.

Amitabh Varshney: So the College of Computer, Mathematical, and Natural Sciences is the largest college within the University of Maryland, College Park.

0:03:55 It has 10 departments: the Department of Astronomy; Physics; Atmospheric & Oceanic Sciences; the Departments of the Life Sciences, which are Biology, Cell Biology and Molecular Genetics, as well as Entomology. It also has the Departments of Chemistry & Biochemistry; Geology; Mathematics; and, of course, the Department of Computer Science, which is where my tenure home is. Every year, we graduate close to 8,000 undergraduates and close to 2,000 graduate students. And we are really proud that almost 10% of our students are first-generation students in the college. So, in some sense, I am really pleased and proud

that we are fulfilling the land-grant mission of the university to serve as an equalizer, provide a level playing field to bridge the different classes in our society through education.

Rich Bendis: I think that's a very broad mission when you look at the 10 different departments or colleges within the college.

0:04:56 But I think another thing that's very important to talk about is, I think you have, with your graduates, your 8,000 undergraduates and 2,000 postgraduates, there's a high desire or demand for them to go and be hired by companies. So you might talk a little bit about, Dean Varshney, the success that there is in the graduates from the University of Maryland and able to jump into jobs immediately.

Amitabh Varshney: That is another thing which is so important. I'm glad you brought it up, Rich. One of the things that we have found here is that when we recruit students—both undergraduates and graduates—they come from all across the country and from around the world. And then two-thirds of them stay back in this region. They find employment in Maryland, D.C., or Virginia, and these are in all across various fields. And, in some sense, I feel like our university and our college are serving as this incredible magnet for talent, and then bringing them to our local community, and finding this incredible talent pipeline that is then being very gainfully employed, and contributing to both advances in the sciences, as well as enhancing the economic competitiveness of our state.

0:06:11 So, as an example, there are lots of things we could talk about, but one of them I think I should mention is that our university boasts one of the largest computer science programs in the country, with more than 4,300 undergraduates. And these undergraduates can pursue specializations in areas such as cybersecurity, data science, machine learning, quantum information. And almost 1,000 of them are women, making it one of the largest female computer science populations in the country. In addition, these are not just numbers but also really talented, really talented undergraduates. So, according to the latest graduation survey, 96% of our students were placed right after their graduation with a median starting salary of $110,000 with several notable employers in the area, such as Accenture, Amazon, Booz Allen Hamilton, Capital One, IBM, JPMorgan Chase, Leidos, Lockheed, Northrop, and so many others.

0:07:13

Rich Bendis: Plus the federal agencies too.

Amitabh Varshney: Plus the federal agencies.

Rich Bendis: FDA and NIH and NIST, and all of these organizations.

Amitabh Varshney: Exactly, yeah. So it's really very exciting to see how these students are carrying on with the quest to further this frontier of knowledge in the sciences across both policy-making, as well as advances in the labs, translating the advances in the labs to the actual people who are going to be using these advances through the industry. It's a very amazing ecosystem that we are finding ourselves in the center of.

Rich Bendis: But we hear a lot from a lot of academic institutions and other regions around the country is brain drain; that, basically, you educate the students and, all of a sudden, they graduate and then they leave.

0:07:59 And what you're saying is, you're trying to dispel that theory because the University of Maryland and your graduates—did I get that right? You said 65% or 66% of the graduates actually stay within the region?

Amitabh Varshney: That's right. So 64% of the bachelor's degree recipients from our college stay in our region.

Rich Bendis: That is fantastic. That plus the 96% who get jobs at an average of 110,000, the future is bright for students entering academia right now, especially in the field of which you're the dean of. I'm sure that you have a lot to do with that, Dean Varshney.

Amitabh Varshney: I think it's an incredible team here. This is amazing faculty, amazing staff. And, also, in some ways, I'm really proud of the quality of students who are coming in. The quality of the students we graduate is directly tied to the quality of students we get in, who are just incredible. And, in some sense, I feel like what we are really doing is polishing these gems to make them be as bright as they can be. [laugh]

Rich Bendis: Yes. They are rough diamonds, and they become polished when they graduate the University of Maryland.

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Amitabh Varshney: Absolutely. And one more thing I want to mention is, in addition to employment, which is what we have been talking about, we are also ranked among the top five among entrepreneurship schools in the country by the *Princeton Magazine*. And there's a very vibrant entrepreneurship culture here at the University of Maryland, which has led to some incredible alums. Folks in computer science, the examples are Brendan Iribe and Michael Antonov, who co-founded Oculus, sold it to Facebook, now Meta, and turned around to be very generous and incredibly generous philanthropists in their early 30s, who donated to build up the computer science and engineering building, which is now named as the Iribe Building. They have also endowed a number of professorships, a number of scholarships. And it's really incredible to see such generosity from entrepreneurs like Brendan and Michael, but there's others. Sergey Brin, co-founder of Google, graduated from here.

0:09:59 Jagdeep Singh, co-founder of QuantumScape, graduated from here. Dave Baggett started with the *Crash Bandicoot* game, and then started the ITA software, which was later sold to Google. So if you're doing a Google flight search, it's Dave Baggett's work. He's currently working on his next startup in the area called Inky. Anthony Casalena started Squarespace. Mokhtarzada Brothers—Zeki, Idris, Haroon—started Truebill, which is another big company. And also, I have to say, we have a number of such incredible entrepreneurs. DJ Patil, by the way, who was the first chief data scientist for the United States, is a PhD from our college. And the current president of the American Association for Advancement of Science, AAAS, Willie May is a graduate from our college. So it's been very amazing to see such an incredible set of students from our university and our college go on to have such a big impact in society.

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Rich Bendis: I think we need to promote that a little bit more because it goes to show you don't have to be in Silicon Valley or in Boston to go to Harvard, MIT, or Stanford. You can have some of the same success going to the University of Maryland.

Amitabh Varshney: Oh, absolutely, I mean, this is exactly true. And especially if you look at how low our tuition is and how high our quality is, it's just incredible.

Rich Bendis: If you look at the quality of life and the cost of education compared to some of the other people that we've mentioned, you can get equal to or better education at a high quality of life without the challenges that you have in some of these other major technology cluster areas in the United States, and it's right here in College Park, Maryland.

Amitabh Varshney: And I think one of the other things which is so interesting here in this area is the amazing cosmopolitan nature of it, with the multiple airports, multiple job opportunities, multiple ethnicities, an incredible array of restaurants, and incredible schools.

0:11:56 The schools are just so amazing in this area, Rich. I have to tell you, both my children are going to public schools, and I couldn't be prouder of the incredible quality of education that they're getting here in this region.

Rich Bendis: I think that's exciting. When you talk about this and the diversity, basically, if you look at the diversity of our region, it's almost unparalleled in the United States in all of the things you've talked about. Then you put on about 155 different embassies from countries around the world, located right in Washington, D.C., so you have almost every culture represented within the BioHealth Capital Region. And that diversity really enhances the quality of exposure the students get as they're going through their education. It's not just meeting with the same class of students that you might have in some other traditional academic institutions. I think the diversity is almost unparalleled in this region.

Amitabh Varshney: The diversity and also the accomplishments. So, as an example, I was reading somewhere we have the highest per capita astronauts in this region. We have the highest per capita PhDs and doctors in Bethesda.

0:13:00 It's quite amazing diversity in multiple dimensions.

Rich Bendis: Well, you've done a good job early in this podcast of selling the University of Maryland and Maryland. So let's talk about some of the exciting things that are new that have been created. Earlier this year, you launched the Artificial Intelligence Interdisciplinary Institute at Maryland. It's called AIM, A-I-M. How did this initiative evolve and, basically, what kind of faculty and students are attracted to this type of initiative? And talk a little bit about the AIM that I'm sure you've been responsible for.

Amitabh Varshney: So, Rich, you're talking about a topic very close to my heart with this AIM. So I've been here, like I said, in computer science for 25 years. And over this time, I have seen that the department, the college, and the university have invested heavily in AI over the years. And some of it has been absolutely incredible. I mean, when I came here in 2000, I was seeing these self-driving robots autonomously walking in the corridors of the computer science building at that time.

0:14:05 Now, this was 25 years ago. They would be walking very, very slowly. [laugh] They'll be moving very slowly, but that was pushing the limits of computation at that time. Now, if you look at it, there has been incredible work here in natural language processing, text summarization, understanding optical character recognition, looking at medical imaging, working on computer vision, perception, cognition, as well as robotics and in reinforcement learning and areas like that. Now, as a result of this longstanding leadership in AI, if you go to websites like CSRankings.org, and you look at what are the areas, what are the universities that are the top ranked in applied AI and foundations of AI, we are ranked as the number one public university in artificial intelligence in terms of the quality of publications, the reputation of the outlets over the last five years.

0:15:02 And things like this don't happen by themselves. This has been just an incredible partnerships with federal agencies, partnerships with companies, and the vision of a number of early leadership of the University of Maryland that has gotten us to this place. So, in some sense, when the entire society discovered artificial intelligence through tools like ChatGPT and others, this was something that was not very surprising to us. We have been working on this for a very long time. And the President Darryll Pines and Provost Jennifer King Rice, who have been quite forward-looking in a number of ways, they have always been encouraging us to focus on the grand challenges facing the society. And, certainly, the pivotal role that AI is playing and will play in the transformation of work, and how we entertain, how we create, how we discover and innovate, in all of these areas, AI is poised to play a very critical and central role.

0:16:06 So, recognizing this, they have launched a major initiative through this Artificial Intelligence Interdisciplinary Institute at Maryland that we

briefly abbreviate as AIM [laugh], and this has multiple facets. So we have announced that we will be hiring 40 faculty in this initiative. These will be faculty not just in computer science and computer engineering but also in the arts, in the humanities, in the social sciences, in other sciences, in public policy, in journalism, and in all areas, to really have a broad-based interdisciplinary view of how to catalyze advances in society through artificial intelligence. We are also committed to creating new talent workforce development pipelines by having undergraduate majors in AI and a master's in AI.

0:17:02 In addition, we have launched a seed grant program for encouraging faculty to work across traditional discipline boundaries, creating new courses and new research areas that would stand the test of time for the future of AI. And it's amazing. It's very exciting that all of this is happening right here in this region.

Rich Bendis: This is really exciting. And, to be honest with you, AI, as you mentioned, interdisciplinary, it touches everything. It's an enabling technology, and sometimes people—it's really when I've gone through a number of different major technological evolutions, when you go back to nanotechnology and biotechnology and now artificial intelligence, machine learning, and quantum, people have challenges because, when you look at it, a lot of them enable, but it's hard for them to understand what the end product or what results from the utilization of that technology. AI probably is more mysterious than anything because it does impact everything.

0:17:58 And then you have the positives and negatives associated with AI that people have to overcome, because they're really just becoming educated in its utilization. And then, of course, you have the bad actors out there, who want to use AI for other purposes other than really to add value to society. So how do you look at the balance? And this isn't something that was scripted, Amitabh, but how do you look at the balance with AI right now for everybody with an emerging technology that everybody's trying to wrestle with and get their arms around?

Amitabh Varshney: So this is a very interesting, very deep question, Rich, and one that we have also been considering very deeply. So the first thing I want to mention when it comes to AI is, the best way to look at this is as an enabling technology. And with all enabling technologies, whether it is the

use of tools that we had, the invention of the railways, or the invention of computing itself, or the internet, these are all technologies that have dramatically enhanced our productivity in the society, and have resulted in advances and products and solutions and technology that have enhanced our economic competitiveness, and made these results that have affected our society in greatly beneficial ways.

0:19:16 So, as we go forward in this era of AI, we have to keep in mind the end users and applications, which would be driving the use of AI in a wide variety of areas. With every new technology, there's always a cause for concern because it could be used for all kinds of purposes. However, in my mind, at least, there is no doubt that this is a net positive for us. There is so much that it will allow all of us to be able to benefit from in our society in terms of productivity and in terms of allowing each of us to reach our fullest potential.

0:19:57 If you look at the evolution of technologies throughout the human society, whether in the early days, we had painters and sculptors, and then we had the invention of the camera and then the digital photography, and it did not result in people who were no longer—all the designers and the artists just changed the way in which they were working. They are now working with tools in computational photography and computer-enabled design, but they are still very much in use. In fact, they are more in use now than they were in the 18th and early 19th centuries. And I believe something similar will happen with AI, where it will empower more of us to reach our fullest potential in a way that was just not possible before.

Rich Bendis: I think your historical perspective on the evolution of technology, and how it's evolved to where it is today, is a good example. And I think, when you reference it that way, it also shows that it's not really killing jobs or killing industry; it's enhancing the quality of the work that's being done, and generally expands the opportunity for the economy.

0:21:05 So maybe that is something that would be an interesting presentation to give on the evolution of technology leading us to where we are with AI, quantum, and machine learning. And you've probably done that already, but I'd be interested to see something around that, Dean Varshney.

Amitabh Varshney: Oh, I would love to talk more about this, Rich. This is an area which is just so fascinating. Opportunities like this come once a generation, such transformative advances. And it's very exciting when you see these dramatic shifts happen in the flow of technology, and its adoption in the society.

Rich Bendis: Well, I'm going to give you an opportunity in September. We have our BioHealth Capital Region Forum, which we have annually, and this will be the 11th year. But I'm going to give you a platform to talk about the evolution of AI, and where we are today at it, if you'd like to accept.

Amitabh Varshney: I would love to do this, Rich. Thank you. [laugh]

Rich Bendis: Well, there you are. And then what we might be able to do also is to be able to bring some of your graduates that you mentioned.

0:22:01 They could be on a panel with you, and talk about their successes that they've had and enjoyed at the University of Maryland.

Amitabh Varshney: Oh, that'd be great.

Rich Bendis: We're going to build around that. Let's move on a little bit now. Another new initiative beyond AIM is something that was created about two years ago called the University of Maryland Institute for Health Computing, and that's actually in Rockville, Maryland. It's a partnership between Montgomery County and the University of Maryland, which is very exciting to see partnerships evolving. So can you talk a little bit about the Institute for Health Computing, how it's evolved to where it is today, and what its goal is to help support and provide services to companies and other institutions around health computing?

Amitabh Varshney: Oh, absolutely, Rich. This has been very exciting to see its birth and the subsequent growth. So let me just take a step back, and go back about two decades ago. So, at that time, the human genome was discovered. It was sequenced right here in Montgomery County, both at the NIH as well as the Institute for Genome Research, TIGR.

0:23:02 And, at that time, that advance was enabled by the use of sophisticated computer algorithms in the cutting-edge, latest computers that were available then. Just as we have been talking about AI, we feel that several advances in computing in the last two decades have now positioned us so

that now we are at the cusp of incredible transformative advances in health by leveraging the latest in computing. And this includes artificial intelligence, and it also includes areas like augmented and virtual reality, as well as advances in computational biology and bioinformatics. So, with this, one of the examples that I want to highlight is, right around that time, we had professors at another sister institute to the Institute for Health Computing. This is the IBBR, Institute for Bioscience and Biotechnology Research, located in Shady Grove, right here in also Montgomery County.

0:24:01 And Professor John Moult, with his colleagues, started a critical assessment of structure prediction for proteins. So the problem is, basically, you can identify the sequence of amino acids for proteins. The challenge is, from that one-dimensional sequence of amino acids, can you reliably predict the 3D structure of the proteins? And the 3D structure of proteins is very important because that is what lies at the heart of all the therapeutic drug discovery, understanding the structure and function of proteins, and how they catalyze a wide variety of biochemical reactions in the body. So, for a number of years, that competition was about how can you bring together the best people from around the country in teams, and see who can best predict the structure of a protein that could be then validated against unpublished but discovered 3D structure of a protein? Now, in 2020, something amazing happened.

0:24:59 The winner of this competition was Google's AlphaFold, which was the AI program that did a better job in predicting the structure than any human could at that time, any human team did. And this resulted in the 2024 Nobel Prize being awarded to Demis Hassabis, John Jumper, and David Baker for their work on designing and building the AlphaFold. So the reason I'm taking this slight segue is to talk about how the advances in life sciences and health computing are being catalyzed right here in Montgomery County over a period of two decades, and why we believe that the formation, the creation of this Institute for Health Computing will position us in a very powerful way to continue to maintain our momentum and further enhance these advances in health computing. So the Montgomery County Executive, Mark Elrich, as well as the Montgomery County Council had this visionary idea to go forward in creation of this Institute for Health Computing.

0:26:04 We have partnerships here with the University of Maryland, College Park, University of Maryland, Baltimore, as well as the University of Maryland Medical System. So while we bring in our expertise in computer science, engineering, and other sciences, University of Maryland, Baltimore brings in its expertise in clinical health, in patient care, in a wide variety of medical areas, and the University of Maryland Medical System brings in the expertise in the electronic health records for patients, which are, like we mentioned earlier, one of the most diverse in the country. So bringing together this group, we just celebrated our two-year anniversary. We now have 80 people of all kinds of professional degrees—MD, PhD, MBA, JD, MSc, Master's in Public Health, and even MFA—who are coming together to create this ecosystem, this nucleus of an ecosystem that can catalyze amazing advances working with the local industry, as well as the federal agencies in this area to advance health computing.

0:27:08 So a very exciting time.

Rich Bendis: That's exciting. And the excitement doesn't stop there because another first for the University of Maryland is the first pure quantum computing company that went public came out of the University of Maryland, IonQ, and that's another one of your success stories. And I think it's just reached a major capitalization value in the stock market. But, as a result of that success with IonQ—which you can talk a little bit about—we also had an exciting announcement on January 14th from Governor Moore, who announced a new initiative, which would be a $1 billion leveraged capital initiative on quantum that would be focused around the University of Maryland, College Park.

0:27:58 So let's talk about one event sort of triggered the other. The IonQ success helped trigger Maryland wanting to be the quantum king around the world. So, Amitabh, talk a little bit about that, please.

Amitabh Varshney: So quantum computing is one of these areas where it's been very exciting to see the birth of IonQ, the growth of IonQ, but also all the associated areas in quantum. So, in general, if I look at the area of quantum science and technology, there are multiple components in this. Quantum computing is one, quantum sensing is another, and quantum networking is a third. Each of these areas are looking at various aspects of underlying quantum phenomenon and harnessing it for seeing how we could

communicate, how we could sense, and how we can compute problems that would be otherwise incredibly difficult to solve.

0:28:53 So this investment that Governor Wes Moore and Lieutenant Governor Aruna Miller made yesterday at the IonQ facility was one of the most exciting events I have been to in my life here at the University of Maryland. Imagine a $1 billion public-private partnership that would propel a science area into the forefront of the national consciousness. This has—very few pivotal moments like this come along. And, I really have to say, this is what makes Maryland such an exciting place to be. We have seen IonQ start from the lab of one of the University of Maryland professors, Chris Monroe, go to a seed round of $20 million. And with this incredible workforce that we have here in quantum computing, quantum sensing, quantum science and technology, along with the partnerships with investors, venture capitalists, but also the entire ecosystem that University of Maryland is starting, has created with partnership with the state, I believe this morning it was well north of $8 billion, employing 450 people.

0:30:01 And this is where I really believe Maryland shines. To create such an amazing ecosystem out of basically one professor's lab is what is so inspiring about this development. And now there is a virtual stampede of all kinds of quantum-related efforts. Companies are looking to relocate to College Park Discovery District from Europe. They are looking at new areas. There's a Quantum Startup Foundry, which has just started. There is the QLab, which is there to make it easier for people to program on the quantum supercomputers. So, overall, this is very exciting, very promising, and I think this could only happen in Maryland.

Rich Bendis: You're right. I've been involved in cluster development around the world in the United States and, generally, you have to have a pivotal moment and a champion and a leader in order to build your cluster around.

0:30:57 So I think what's emerging right now, you have the University of Maryland with its strength in its computer science, math, and natural sciences department, and the successes, as you mentioned, with the other entrepreneurs in the past. You have these progressive institutes like AIM and Institute for Health Computing that are going, plus this great success with IonQ. And this is really—what's important now is to have—you mentioned private-public partnership—it's having federal, state,

local government, academia, industry, entrepreneurs, and capital all coming together, and that's how clusters emerge. And, really, I think, the goal has been identified is to make Maryland the quantum capital of the world. And I don't know if there's any other place in the world that is better prepared with as many assets as Maryland has to do this.

Amitabh Varshney: That's a really good point, Rich, you have brought up. So one of the things which is very interesting that you brought up about the clusters of these economic development and economic growth, it's very critical to identify these clusters ahead of the curve.

0:32:03 It requires people who can see over the horizon, because if you are going to compete in clusters where others have already taken a leadership role, it requires an immense factor of 100 or 1,000 more investment to draw talent away from other clusters. However, if you can see over the horizon, and see what are the new areas where early investments will result in outsized returns, and nucleating these new clusters, like in BioHealth or in quantum or in AI, where we already have very strong presence and expertise in this region, it allows us to leapfrog our competition, and establish very strong ecosystems locally. And I think we have been really very fortunate in having a sequence of these clusters take root right here in quantum, at least.

0:33:00

Rich Bendis: The other thing that I think is important is, if you look at convergence now, you look at convergence of healthcare, bio, you look at technology, look at quantum, all of them become interdependent on one another, and they're complementary as we look at the economy growing. Because if you look, all people in the pharma and the bio world right now are incorporating AI, machine learning, and quantum into their drug development, drug discovery, some of their marketing efforts that they're doing. So what we have is the unique ability to merge these assets that all reside within our BioHealth Capital Region to come together. And, again, I don't know of any other region that has the ability to have that convergence factor as strong as what we have here in Maryland.

Amitabh Varshney: That's a really good point, Rich. This confluence and convergence positions us as a very unique place to be at this moment in time, where

these incredible advances in technologies are poised to severely disrupt, in a positive sense, the healthcare market, the healthcare industry.

0:34:04 And we are right now at the very forefront of this technology revolution unfolding before our eyes. We couldn't be in a more exciting time than this.

Rich Bendis: We're both very fortunate to be living this in our careers now, Amitabh.

Amitabh Varshney: [laugh] Absolutely.

Rich Bendis: So we could talk for a couple more hours, but I know that listeners only have a certain ability to listen to a podcast for a certain amount of time. So, even though we could take care of them for another couple hours, we're going to close, and then we'll come back and do another one as we look at the progress that you're having with all of these new initiatives at the University of Maryland. But we're talking with Amitabh Varshney, who is the dean of College of Computer Mathematical and Natural Sciences and professor of Computer Science at the University of Maryland in College Park. So I'm going to close by giving you an open mic here. Are there any things that we didn't discuss that you'd like to enlighten the listeners about today in this podcast before we close?

0:35:00

Amitabh Varshney: So, Rich, it has been very exciting and very entertaining talking with you, honestly. And, also, what a way to reach your listeners through this medium. It's been very interesting. So the main thing I just want to leave everyone with the message that, a long time ago, I was reading this book on *The Structure of Scientific Revolutions* by Thomas Kuhn. And in it, he talks about how scientific revolutions happen in a staircase pattern. For a long time, things just build up on themselves slowly, and then there are these pivotal moments when dramatic changes happen, and that's where the scientific revolution happens. And I think we are in the early stages of one of those scientific revolutions right now. Like you said, the advances in AI, in quantum, in virtual and augmented reality are poised to have a huge impact. And in our region, looking at that impact from the lens of health and life sciences creates an incredible opportunity for us here in Maryland to advance the field for the greater good of the nation and the society.

0:36:03 So I can't wait to see what the future brings with these advances, and I look forward to coming back and talking further about these advances with you, Rich. Thank you so much for the opportunity.

Rich Bendis: You're welcome. And you say you can't wait to see what the future brings. Well, you're going to help bring the future to us, Amitabh, so you're going to be one of the people to help change the dynamic of the future.

Amitabh Varshney: [laugh]

Rich Bendis: Don't downplay the role that you and the University of Maryland can have on all of our futures. So thank you for being on *BioTalk* today. As I mentioned, we have a number of things to follow up on, and we will definitely do another one down the road to talk about the successes you have. And I'm sure all of the listeners will look forward to hearing you speak at our BioHealth Capital Region Forum on September 23rd and 24th, which will be in Rockville this year. So thank you again for being on *BioTalk*.

Amitabh Varshney: Thank you, Rich.

Narrator: Thanks for listening to *BioTalk* with Rich Bendis.

End of recording