
**“The future belongs
to online universities
that strike deals
with companies
for internships and
apprenticeships”**

**Inaugural lecture
2020/2021**

**25th anniversary
of the UOC**

What Is the Future of Education? A lecture
by Sanjay Sarma, Professor of Mechanical
Engineering and Vice President for Open
Learning at the Massachusetts Institute of
Technology (MIT)

**Wednesday 21 October 2020,
4 p.m. (CEST)**

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Inauguration of the UOC's 25th academic year



- Introduction given by the UOC President, Josep A. Planell.

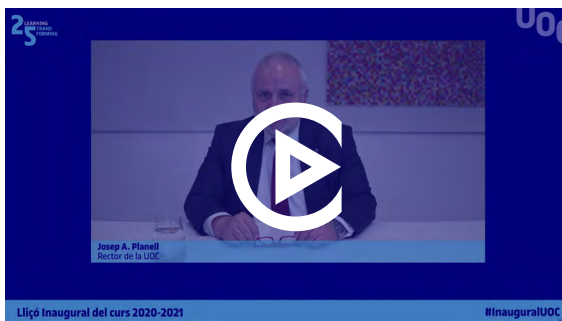
- Professor Sanjay Sarma's lecture:
What Is the Future of Education?

Modern Educational Institutions have evolved over a thousand years. But we are at a cross roads in many respects: society, the economy, the future of work, and technology. For universities to be successful over the next hundred years, let alone a millennium, introspection is needed. What do students get from universities? How can online education play a role in the future of society, work and human potential? How has COVID changed things? I will present my views on these questions and reflect on the role that UOC can play in shaping the future.

- Speech by the Chair of the UOC Board of Trustees, Pere Vallès.
-  [Video commemorating the first 25 years of the UOC](#)
- Closing address given by the Government of Catalonia's Minister for Business and Knowledge, Ramon Tremosa.



Introduction given by the UOC President, Josep A. Planell



Dear all,

The creation of the UOC in 1995 was an act of disruption. The team led by our founding president, Gabriel Ferraté, shunned the possibility of copying existing formats. Instead of searching out ready-developed solutions they identified revolutionary questions. And this was where our unique model began: the world's first online university.

Today, that 'far-out creation' is still going strong. Strong in education because online education is here to stay – at least if we are right in assuming that there will remain the need for the right methodologies, technologies and equipment, and that digital transformation is equally important for teaching, research and university

administration. Because there is no field unaffected by digital transformation. Never before have digital skills for all been understood as such a priority, as the cornerstone of any society that believes in fairness. Quality access to the internet, without paying unreasonable fees and with net neutrality for all, as well as adequate training to make the most of it – an essential factor – are of critical importance in terms of citizens' rights.

Technology provides the leverage, but it is the teaching model that puts the student at the centre, and it is the collaboration between peers, the ongoing support and guidance and, overall, the quality of the online learning that ensures that this innovation can be useful at all different moments in students' lives and careers.

With the fourth industrial revolution now under way, we want to be fully involved in this digital transformation of our future: in the shoes of the people studying, of those training themselves, of those renewing their skills, and of those shaping tomorrow's world.

The question what is the future of education? is the subject of our inaugural lecture to be given by the Vice President for Open Learning at MIT, Sanjay Sarma. In the words of our guest, "Human beings are what we are because of learning," once we've dealt with our basic needs, learning is the main characteristic that sets our species apart.

Introduction given by the UOC President, Josep A. Planell



This belief in the importance of learning is something Professor Sarma carries into his leadership of both MIT's Office of Digital Learning and the Abdul Latif Jameel World Education Lab, roles that make him responsible for developing new online education models, supervising various blended and open learning initiatives, and working with universities worldwide, including the UOC, on the evolution of education from here forward.

Have an excellent academic year 2020/2021!

Josep A. Planell
President of the UOC

Summary: “The future belongs to online universities that strike deals with companies for internships and apprenticeships”



The UOC began the 2020/2021 academic year as usual, inviting its community to come together in an opportunity for debate and reflections.

This time the inaugural lecture was given by Sanjay Sarma, Professor of Mechanical Engineering and Vice President for Open Learning at the Massachusetts Institute of Technology (MIT), who spoke about the future of education. Sanjay Sarma is a leading authority worldwide both on research into the science of learning and on mechanical engineering, and is credited with developing technology used in RFID.

His talk called upon us to keep on studying which university models will work best and how online education can play a role in the future of society, work and human potential. The event also marked the start of celebrations for the UOC's 25th anniversary.

Presiding over the inaugural lecture was the UOC's President, Josep A. Planell, who highlighted how the University's creation in 1995 was an “act of disruption”, and sustained that that this “far-out creation” is going stronger than ever. “With the fourth industrial revolution now under way, we want to be fully involved in this digital transformation of our future: in the shoes of the people studying, of those training themselves, of those renewing their skills, and of those shaping tomorrow's world,” Planell said.

Summary: “The future belongs to online universities that strike deals with companies for internships and apprenticeships”



The event was also attended by Pere Vallès, chair of the UOC's Board of Trustees, who introduced a video commemorating the University's 25 years. He highlighted the vocation for public service with which the UOC was created and its commitment to developing a distanceless model that would lower the entry barriers to higher education, foster lifelong learning and meet the needs of the society to which we belong.

The closing address was given by Ramon Tremosa, the Catalan Minister for Business and Knowledge and head of university and research policy in Catalonia. He applauded the University's continuous growth and the success achieved by its model, evidenced by the UOC's presence in the leading international rankings.

In these pages you will find both [the video](#) and a transcription of Sanjay Sarma's lecture.



“More and more people are becoming self-employed and we are becoming more and more freelancers. What does it mean to the students that we’re preparing? Well, it means a couple of things. But the most important thing is the student has to become the CEO of their own life and the student has to become the chief learning officer, the chief marketing officer of their own life.”

“We have to get ready to really adapt to a new normal and for us to adapt to this new normal, we have to get away from a model of human beings as interchangeable parts. The future cannot be one in which we cut young people’s dreams to fit what we want. The future has to be that we need to give these young people knowledge and agency to succeed in the future.”

“I will say it is my view that education today is in the same place, today, that medicine was in at the turn of the last century. In other words, we haven’t really understood how the brain works and we haven’t applied it.”



“What is fundamentally even more worrisome is an assumption about learning. And the assumption is that the professor has a pen and the student’s brain is a sheet of paper. And that’s a very unfortunate assumption. And the reason that’s unfortunate is because the human brain should really be treated as an organism that grows.”

“If you learn very quickly as if you’re putting a lot of food in your mouth, it’s not going to last in your body very long. For long-lasting learning, you actually want to do short chunks, you want to learn over a long time, slowly, and you want to repeat things, and then you get long-lasting learning and that is applying principles like spaced retrieval.”

“Curiosity is the hunger of learning, and the saliva of learning is a neurotransmitter called dopamine. So if you make students curious, they will learn, end of story.”

“These lectures that we do in person, they have to go online. An online lecture can be paused, it can be fast-forwarded, you can consume it slowly, you can interrupt it. You can do it double speed and all the things that we waste the classroom for today. And all the cognitive tricks, you can actually apply online: retrieval effects, spaced repetition, interleaving – by the way, Duolingo, Babbel, all these software programs use this. You can do all of that online, and online does it better than the lecture. And this is where UOC comes in. You were designed from the beginning to go this route. You were visionary.”



“I hope that the universities, the regular universities, the MITs, the Harvards, the traditional universities will become places of action, creation and impact. But I think the future belongs to online universities that strike deals with companies, internships, apprenticeships.”

What Is the Future of Education?

Five key talking points

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1. How the adoption of technology affects work and learning

In some ways, before automation, human beings were the automatons and that's how our education system has come to be. Now, fast-forward to the twenty-first century. And if you look at technology over the last hundred, fifty, thirty and twenty years, you can see the technology's adoption cycles have become much faster. Television may have taken 20, 30, 40 years to be adopted, but if you take something like TikTok, it's scaled within a couple of years.

What that means is that the half-life of a lot of our jobs is really plummeting. In other words, your skills become out of date very quickly. And we've seen this during Covid. And there is this trend, which many of you know about, which is called the gig economy. The basic idea is – and this is a chart from The Economist about how more and more people are becoming self-employed and we are becoming more and more freelancers, not all of us, but many of us.

What Is the Future of Education?

Five key talking points



In fact, I do a lot of freelancing, right? So although I'm a professor, like a lot of professors, we do a lot of consulting and so on. Now, what does that mean, though? What does it mean to the students that we're preparing? Well, it means a couple of things. But the most important thing is the student has to become the CEO of their own life and the student has to become the chief learning officer, the chief marketing officer of their own life.

They cannot any longer be an interchangeable part that you give to a factory and the factory plugs them in. These people have to become individuals with agency and with success on their mind, and they have to succeed on the strength of their abilities not on their degrees, more and more.

What Is the Future of Education?

Five key talking points

05

Video



Key ideas

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“The student has to become the CEO of their own life and the student has to become the chief learning officer, the chief marketing officer of their own life.”

2. Adapting to the new normal

Covid has impacted so many industries. Some industries, well, Google, Zoom, I'm using Zoom right now. The valuation of Zoom exceeds the valuation of the top ten airlines combined. How shocking is that? Online commerce, telecoms, online health care, because it's harder to go to the hospital, but many industries are very badly affected. Retail, commercial real estate, airlines, hotels, restaurants, even the concept of a city is going to break down because now people are used to working remotely.

Why live in a downtown when you can live in a ski resort? In fact, there's a joke in America, we used to call them boomtowns, and now we're talking about the growth of Zoom towns. You live in a ski resort, you work remotely, you go skiing in the evenings, you know? But if you see this massive change in jobs, what you're also going to see is a massive job shift, and many of us have had to become very urgently experts in Zoom, we're seeing that, we are doing it ourselves. We're reskilling, right? And this is going to be the future. Now, if this is the future and, by the way, I do not believe that Covid-19 is a one-off.

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Five key talking points



Keep in mind, this is the third or fourth, there's a third coronavirus and many more viruses and diseases have come in the last 20 years like Ebola. We've had MERS and SARS, which are the previous coronaviruses, but then we have climate change, we have political unrest, we have refugee issues. So we have to get ready – extreme weather is the other one – so we have to get ready to really adapt to a new normal and for us to adapt to this new normal, we have to get away from a model of human beings as interchangeable parts.

The future cannot be one in which we cut young people's dreams to fit what we want. The future has to be that we need to give these young people knowledge and agency to succeed in the future. And I say young people, but I mean people of all ages, really, because as you will see when I talk about it, we will all have to retool. We have to prepare young people to become the CEOs of their lives, and we have to become the CEOs of our lives.

What Is the Future of Education?

Five key talking points

05

Video



Key ideas

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“The future cannot be one in which we cut young people’s dreams to fit what we want. The future has to be that we need to give these young people knowledge and agency to succeed in the future.”

3. How do our brains work?

It's quite magnificent. It is such a beautiful thing. In my view, the most beautiful and complicated thing in the world is not in the stars, it's not in the skies, it is inside each of us. It's in our little children. It's in our friends. And we are understanding how the brain works.

And we understand, for example, where empathy and insight and emotion and morality and intuition, all these things come from: the red piece in the front of the brain that is called the prefrontal cortex, PFC. And that's where many of these functions come from. It is the CEO of your brain. It is something you have that our cousins the apes don't have. Right? It is the CEO. It is the number one important thing.

And then behind that are all sorts of other things. You have things like the limbic system, which I'll refer to later on, which tells us about emotions and safety and things like that, the reward system. We are understanding all these things. Why is this happening now? It's happening because of technology, actually. It's happening because we're understanding how to image brains. There's a beautiful history, starting with Mossi. Mossi showed that you can determine which part of the brain is active by just measuring the blood flow there.

It's hard to measure blood flow. But through a series of discoveries, we found that you can measure blood flow through an MRI, because blood, when it carries oxygen, repels a magnetic field.

What Is the Future of Education?

Five key talking points

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And so with that, you can see which part of the brain is active during which activity. Now, based on all that, honestly, if you have to teach, if you have to redesign the classroom today and, of course, the UOC is a new university, it's only a couple of decades old. You were designed in a new way. But traditional universities, including mine, MIT, are based on a very old model. And that old model is seven hundred to a thousand years old. And in that old model, if you look at it, nothing has changed. We're still giving lectures. And if you look at this picture of the University of Bologna from 1308 and you look at this gentleman in the blue robe, he is sleeping like some of my students do when they get bored of my lecture, right?

And you can see that these two are talking to each other and this guy is looking at his Facebook feed, you know? So nothing has changed in seven hundred years. But what is fundamentally even more worrisome is an assumption about learning. And the assumption is that the professor has a pen and the student's brain is a sheet of paper. And that's a very unfortunate assumption. And the reason that's unfortunate is because the human brain should really be treated as an organism that grows.

If you have a puppy, you don't give it food in the beginning of the week and say you're done. You have to give the puppy food when it wants food. You have to give it play when it wants play. But we in our factory model have ignored that and we just declare victory when the professor has given the lecture and walked off. And we don't pay attention to the fact that the student has to take these little tidbits of information and organize them into a treasury that will serve him or her well for life.

What Is the Future of Education?

Five key talking points



And if you actually think about it that way, you begin to realize that it's actually more complicated. You see, the way the brain works... You remember I pointed at my forehead and I said that's called the prefrontal cortex, the CEO of the brain, right? You can think of that prefrontal cortex as a little cartoon and the cartoon I use is that of a leprechaun just because leprechauns are cute. And what this leprechaun does is every time your eyes and your ears come to knowledge – or if you're visually impaired, your fingers – when you come across a little bit of knowledge, the leprechaun goes and picks up that stuff, has to quickly run back and then recast the information in a way that makes sense to you and then put it away.

Now, it turns out that's a very tiring task. And when the leprechaun is doing that – by the way, just to remind you, the leprechaun is the executive function, the CEO, and this action of recasting information is what we variously call consolidation, integration, sense-making, saliency, why is this important, connecting the dots. Now after about 10 minutes, you know what happens? The leprechaun goes to sleep because he needs a rest. There's only so much he can do. When that going to sleep happens, really what the brain is doing is it's connecting the dots. It's digesting the information. And the technical term for this is 'mind wandering'. Literally, the brain has to wander after ten minutes. But think about it, every lecture in every classroom today is forty-five minutes, 90 minutes, one hour. And at ten minutes you've lost the students and that's because of nature. And no amount of shaking your finger at the student is going to change that.

What Is the Future of Education?

Five key talking points

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Video



Key ideas

“The assumption that the professor has a pen and the student’s brain is a sheet of paper is a very unfortunate assumption, because the human brain should really be treated as an organism that grows.”

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4. Lessons on learning

We now know so many things. We know how mind wandering occurs. We understand how memory works. There are all these principles we should be applying to learning and we have steadfastly ignored them.

Because the freight train of learning is very hard to stop and we are so convinced what we're doing is right and we are so regulated, we don't change it.

Now, if you take all these lessons and start applying them, you would teach completely differently. For example, this is something called... This combines two or three principles, but it turns out if you look at the red line, if you eat quickly, well, the next day, you know what you're going to do with it, right?

Similarly learning. If you learn very quickly, as if you're putting a lot of food in your mouth, it's not going to last in your body very long. For long-lasting learning, you actually want to do short chunks, you want to learn over a long time, slowly, and you want to repeat things, and then you get long-lasting learning and that is applying principles like spaced retrieval. Hermann Ebbinghaus is a scientist who many decades ago – actually more than a hundred years ago – discovered that the path to remembrance is through forgetting.

What Is the Future of Education?

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In fact, forgetting is the body's signal, the brain's signal to itself that if I'm reminded of this, I'm actually going to remember it longer. Yet every time a student forgets, we get upset with them. And we never give people the chance to forget because they quickly do an exam and move on, but forgetting is actually a very fundamental part of learning. Here's another one. Let us say you're learning something in mathematics like how to calculate the volume of a sphere and how to calculate the volume of a cone and how to calculate the volume of a cylinder.

Every book has a chapter on spheres, a chapter on cones and a chapter on cylinders, but all the science tells us you're better off doing cylinder, sphere, cone, cylinder, sphere, cone and mixing it up. And the reason is, every time you have to do a different problem, you have to forget the old programme, upload the new method and use it. And it's in the uploading that the memory occurs. And you can see we ignore it in the classroom. It's fascinating how many lessons we know.

Here's another one. There was research at MIT that showed that when they did EEGs on students' brains and they did a study to see how students learn, they found that there is a certain brain pattern that leads to better learning. And a professor, Charan Ranganath at the University of California, showed what that emotion is. He showed that we learn better when we are curious. Curiosity is the hunger of learning, and the saliva of learning is a neurotransmitter called dopamine. So if you make students curious, they will learn, end of story.

What Is the Future of Education?

Five key talking points

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Video



Key ideas

“For long-lasting learning, you actually want to do short chunks, you want to learn over a long time, slowly, and you want to repeat things, and then you get long-lasting learning and that is applying principles like spaced retrieval.”

“Curiosity is the hunger of learning, and the saliva of learning is a neurotransmitter called dopamine. So if you make students curious, they will learn, end of story.”

5. What is the future of education? The UOC has been visionary

If you take all these principles and put them in a table, you see what we do in the on-site classroom, what we do online and what we do not do well. The tragedy today is we waste on-site regular classrooms to do lectures. And all the other things – and the reason is because we only test the product for the exams, right? All the other things we don't do well at all. It's a tragedy.

And actually today during Covid, the tragedy is worse because we've taken those lectures and we're doing them through Zoom. The right way to do it is to create asynchronous videos. This man [points to video] is Eric Lander. He's an MIT and Harvard professor. He led one of the two teams that sequenced the human genome. If you're going to learn biology, you might as well watch this man. And if you watch him asynchronously, then the beauty is that you can do a lot more things than you can do if you just did a Zoom lecture.

So now let's look at what the future is going to look like. The future to me is going to look like this. These lectures that we do in person, they have to go online. An online lecture can be paused, it can be fast-forwarded, you can consume it slowly, you can interrupt it. You can do it double speed and all the things that we waste the classroom for today, right? Oh, and all these other tricks, all the cognitive tricks, you can actually apply online: retrieval effects, spaced repetition, interleaving – by the way, Duolingo, Babel, all these software programs use this.

What Is the Future of Education?

Five key talking points



All the programs that we use for learning languages, they use so many of these tricks. You can do all of that online, and online does it better than the lecture. And this is where UOC comes in. You were designed from the beginning to go this route. You were visionary. In fact, most classrooms are wasted. What should classrooms do, then? What should MIT be doing and what have we been doing for the last few years? We've been saying "the things that you cannot do online, we will do in the classroom."

That is, build some context, maybe work on curiosity. There's a lot of work on coaching, hands-on learning. And the beauty for UOC is that the future is many of the things that I have in the left column at the bottom can actually happen through internships, apprenticeships and jobs. So I think that the future is going to be a lot of online, a lot of connections with companies where you can do internships and universities that have the courage to reshape themselves, to focus on the things that we cannot do online and to push online the things that we can do much better online. And that is a multidimensional, what I call flipped classroom. People have called this a flipped classroom, but I'm calling this a multidimensional flipped classroom. It's a complete re-examination of how universities ought to operate. When we come back from Covid, we have to make the classroom count. So I'm going to end with this last slide and just say that universities are in a crisis right now, because when we all return from Covid, I hope to God we don't stare at each other and say, "My God, we could have done this over Zoom."

What Is the Future of Education?

Five key talking points



I hope that the universities, the regular universities, the MITs, the Harvards, the traditional universities will become places of action, creation and impact. But I think the future belongs to online universities that strike deals with companies, internships, apprenticeships.

What Is the Future of Education?

Five key talking points

05

Video



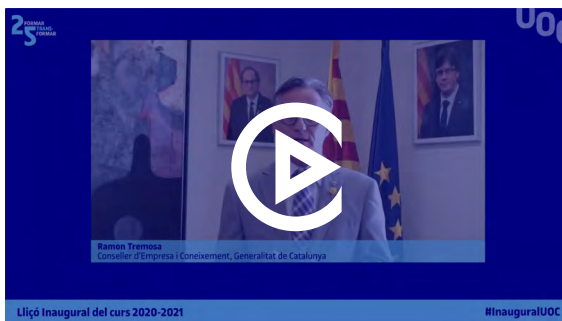
Key ideas

“Online does it better than the lecture. And this is where UOC comes in. You were designed from the beginning to go this route. You were visionary.”

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Closing address given by the Government of Catalonia's Minister for Business and Knowledge, Ramon Tremosa

U6



Good afternoon, President Planell, the UOC Governing Council, the students watching us streaming live, and members of the administrative and service staff.

Thank you for inviting me to your University's inaugural event and the start of a new year that also marks the UOC's 25th anniversary. Immersed in an unprecedented health crisis compounded by an anomalous political context, the times in which we are living are unusual indeed. In the midst of the COVID-19 pandemic, the President of the Government of Catalonia has been barred from office and one of the many collateral effects – with specific impact on the universities – is the suspension of the Law on Science's passage through Parliament, a law that would have had many beneficial effects for research in Catalonia.

Closing address given by the Government of Catalonia's Minister for Business and Knowledge, Ramon Tremosa

U6

However, the extraordinary events of this year will have affected your university community less than others due precisely to the fact that, for the last quarter century, the UOC has been pioneering e-learning as a driver for social transformation. In the course of these 25 years, more than 75,000 students have passed through the Universitat Oberta de Catalunya's online classrooms. In fact, you are Catalonia's top university in terms of number of part-time students. The possibility of arranging their own study schedules has enabled students to combine work and study, and this in turn has fuelled further interest in studying at the UOC.

One of the things I would particularly like to highlight today is that you are still growing exponentially. Between 2014 and 2019, not only has the UOC grown in number of students, but also in many other areas: access to funds for research, which has grown from two million to four million euros; in scientific articles published each year, from 275 in 2014 to 472 in 2019. You have also grown from 14 recognized research groups to 42 today; from 4 chairs to 7; and from 4 approved patents in 2014 to 18 last year.

The UOC and all of you have proven the University's success as an educational model that combines online work with on-site examinations. With this model, you have made your mark in the leading international university rankings. According to the Times Higher Education rankings, you are among the world's top 600 to 800 universities, in line with the Catalan university system as a whole. In fact, today we can say with justified pride that 95% of Catalan students study at the top 5% of the world's universities.

Closing address given by the Government of Catalonia's Minister for Business and Knowledge, Ramon Tremosa

U6

The UOC is a key player in this successful framework. It is a framework that needs continued investment, because it is our future. Digitization, sustainability... All this means progress and well-being. That is why the Government of Catalonia approved the Catalan Agreement on the Knowledge Society in June, with the goal of positioning Catalonia as a hub for knowledge, education, innovation and leadership. From now until 2024, the Catalan Government plans to attain a level of investment in RDI equivalent to 2.12% of the Catalan GDP, putting us on par with the European Union average.

We are living in extraordinary times, immersed in a pandemic and a context of political repression that is eroding our rights and freedoms. But life goes on and we cannot falter, neither in our personal goals nor in our ambitions as a country.

So, without further ado, I now declare inaugurated the Universitat Oberta de Catalunya's 2020/21 academic year.

Ramon Tremosa

Minister for Business and Knowledge,
Government of Catalonia

Sanjay Sarma's biography

07



Sanjay Sarma is the Vice President for Open Learning at MIT, which includes the Office of Digital Learning, the MIT Integrated Learning Initiative and the Abdul Latif Jameel World Education Lab. He is also the Fred Fort Flowers (1941) and Daniel Fort Flowers (1941) Professor of Mechanical Engineering at MIT.

A co-founder of the Auto-ID Center at MIT, Sarma developed many of the key technologies behind the EPC suite of RFID standards now used worldwide. He was the founder and CTO of OATSystems, which was acquired by Checkpoint Systems (NYSE: CKP) in 2008, and he has worked at Schlumberger Oilfield Services in Aberdeen, UK, and at the Lawrence Berkeley Laboratories in Berkeley, California. His research includes sensors, the Internet of Things, cybersecurity and RFID.

From 2010 through 2012, Sarma was Director of the MIT alliance with Singapore University of Technology and Design, which developed and implemented a forward-looking engineering and design curriculum. Leveraging innovation and ideas, Sarma went on to co-chair MIT's Taskforce on the Future of Education, and subsequently was charged with implementing the recommendations around digital learning.

Since 2012, Sarma has served as MIT's Director of Digital Learning, Dean for Digital Learning and now Vice President of Open Learning. In these roles, he has led the creation of the MicroMasters® program credential, developed the MIT Integrated Learning Initiative, founded the Jameel World Education Lab, and created a group that seeks to transform teaching and learning throughout the world, through research, curriculum development, community building and innovative learning offerings.

Currently, Sarma serves on the board of edX, the not-for-profit company founded by MIT and Harvard to create and promulgate an open-source platform for the distribution of free online education worldwide, as well as the boards of GS1, EPCglobal, and several startup companies including Hochschild Mining and Top Flight Technologies. He also advises several national governments and global companies.

Author of more than 200 academic papers in computational geometry, sensing, RFID, automation, CAD, learning engineering, the science of learning and education reform, Sarma has two upcoming books: one on the science of learning and a second on the future of work. Sarma is the recipient of numerous awards for teaching and research, including the MacVicar Fellowship, Business Week's eBiz Award, and InformationWeek's Innovators and Influencers Award. He received his bachelor's degree from the Indian Institute of Technology, his master's degree from Carnegie Mellon University, and his PhD from the University of California at Berkeley.

 Source: [MIT Open Learning](#)

Dossier



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