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MacArthur Genius **Shwetak N Patel**, winner of the **India Abroad Face Of The Future Award 2011**, discusses how his motel owner parents enabled his pursuit of scientific discovery and the discovery of happiness in this fascinating interview with **Arthur J Pais**

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Dr Shwetak N Patel with Microsoft founder Bill Gates, right. Patel is also a Microsoft Research Faculty Fellow



 f you are meeting Professor Shwetak N Patel for the first time, it is better you don't go to his lab.

Unsuspecting visitors, even

those who know he is 30, have stood puzzled wondering which of the young men in the room is the MacArthur Genius. Invariably, visitors head towards his graduate students. They look older than Patel does.

If he shaves off his beard and moustache, he is easily mistaken for a teen, says his wife Julie Kientz, an assistant professor in the department of Human Centered Design & Enginee ring and The Information School, and an adjunct professor in computer science and engineering at the University of Washington.

Patel, a computer scientist and entrepreneur, best known for his work on developing novel sensing solutions and ubiquitous computing, received the \$500,000 MacArthur Fellowship last year.

The fellowships honor 'talented individuals who have shown extraordinary originality and dedication in their creative pursuits and a marked capacity for self-direction.'

The 2011 class of 22 MacArthur Fellows included an evolutionary geneticist, a journalist, two musicians, a poet, a biologist, an elder rights lawyer and a European historian. One of the most valued of awards in

One of the most valued of awards in America, it has also been given to musicians, novelists, potters, filmmakers, scientists, academics and magicians. The South Asians who have received include sarod maestro Ustad Ali Akbar Khan and Harvard professor and surgeon Dr Atul Gawande.

Patel, one of the youngest 'geniuses' at age 29, joined the University of Washington in 2008 as an assistant professor in computer science and engineering and electrical engineering.

He told a university publication last year that winning the MacArthur felt like 'winning an intellectual lottery'. He confessed he collapsed to 'the floor' when he received his early morning call from the foundation in his Seattle home.

The Alabama-raised son of immigrant motel owners gets this animated not only while discussing his work, but also his vegetarianism, the arrival of his first child in

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October, travel (and his honeymoon in Bora Bora), his work with school children and his love for gardening.

Among Patel's inventions is the Infrastructure Mediated Sensing, which can detect noise on electrical systems to monitor the energy usage of specific appliances and electronics in homes.

The MacArthur citation pointed out that in addition to the resource conservation applications of his sensor systems, he is also exploring their potential for home security or elder care, as they serve the related function of sensing human activity and monitoring movement.

The Honor Roll

One of the youngest professors at Princeton, mathematician extraordinaire, a musician of unusual talent, Dr **Manjul Bhargava** won the inaugural India Abroad Face of the Future Award 2008.

An astrophysicist exploring brave new worlds, she pushes the frontiers of our knowledge, constantly. It is the enchanting promise of future achievements that India Abroad recognized last year by conferring on Dr **Priyanwada Natarajan** its Face of the Future Award 2009.

A pioneering innovator in social networking, he built Foursquare, a community of 20 million people and counting across the world. We honored **Naveen Selvadurai** with the India Abroad Face of the Future Award 2010.

From The Editors

For being a technological genius; for developing innovative sensor systems for improving daily life; and for being a brilliant, young visionary. COURTEST: SHWEIAK IN PAILL

Matt O'Donnell, dean, UW's College of Engineering, has called him 'an inspirational teacher' and an innovator who understands the needs of the consumer.

His technology start-up on energy sensing, Zensi, with colleagues from Duke and Georgia Tech, was acquired by Belkin International, Inc in 2010.

He was also named a Microsoft Research Faculty fellow last year, which came with a nostrings-attached grant of \$200,000 for his UW lab.

For this and more, *Seattle Magazine* named Patel as one of its 100 most influential city citizens.

The genius, who has been on the invention path since he was 8, speaks about his work and more to *India Abroad* at his office in Seattle.

Tell us what has happened by way of work after the MacArthur Genius award. We could start with your typical work week.

I am a professor. My primary job is to conduct research, advise graduate and undergraduate students working on our research projects, and teach classes. A typical week is a series of administrative meetings, staff meetings and classes. That's a very small part of what I do during the week.

My day usually starts at 8 or 9 am. I come in, I check in with my students in the lab. One of the things I really like doing is to be directly involved with the work that the students are doing.

My office is strategically located right across from the lab so I can pop in and out all the time. My students may not like it, but I really enjoy it and I think they really appreciate it because I'm really involved in what they do.

So I have in my lab, every now and then, (*meetings*) just to brainstorm ideas to work on projects. I have at least a half hour meeting every week with every single graduate student.

The other thing I do once a quarter is what I call a marathon meeting. I have a one to three hour meeting with each student where we go into a lot more detail about what they want to do in life, what they want to do next M75 India Abroad June 2012

















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'He has so much energy and it's just so infectious'

'Every time I'm around him, I feel this sense of energy and enthusiasm' — **Julie A Kientz** on her husband

Who did the black magic, we asked Julie A Kientz, MacArthur Fellow Shwetak Patel's wife.

"Well....it kind of just happened," she said. "We were both studying for a qualifying exam for the PhD (*at Georgia Tech*). It was a lot of work and we were both doing it at the same time. We were spending a lot of time together and we realized 'Hey, we were more than just friends." An Assistant Professor in the department of Human Centered Design & Engineering and The Information School and Adjunct Assistant Professor in Computer Science & Engineering at the University of Washington, she works on the same campus as her husband in Seattle.

She says she is interested in determining how novel computing applications can address important issues in health and education and evaluating those applications through long-term real world deployment studies using a balance of qualitative and quantitative methods. Her most recent research involves the design and evaluation of computing technologies to support parents tracking the developmental progress and health of their newborn children, individuals with sleep disorders, and families with children with autism.

Kientz received her PhD in Computer Science from the Georgia Institute of Technology in 2008, under the advisement of Gregory Abowd (who was also Patel's adviser), and her BS in Computer Science & Engineering from the University of Toledo in 2002.

On what fascinated her most about her future husband

I think it was his enthusiasm.

He's always so excited about everything and he never really stops moving. You might get that impression of him even if you spend a little time with him.

He thinks a lot, he moves a lot, he just has so much energy around him and it's just so infectious.

So every time I'm around him, I just feel this sense of energy and enthusiasm. This is even one of the things when I wrote my dissertation; I dedicated it to his enthusiasm.

The couple is expecting their first baby in October.

On the cultural challenges in their relationship

I wouldn't call it so much of a challenge as an adventure.

I'm always learning new things and exposed to new things that I definitely didn't experience when I was growing up in the mid-West; where there wasn't a lot of diversity where I grew up. I grew up in Ohio in a small town; we did not get a lot of exposure to different cultures. Getting to know Shwetak and his family and their cultural differences has been an adventure.

It's been just one thing after another. Sometimes, it's oh! 'There's this great new Indian ceremony surrounding weddings that I just learned about for the first time. I'm kind of learning as we go along.

When we go to visit his relatives and Indians around the country, we get to know about different types of food that his family makes and different rituals and customs. It's really been eye-opening and fun.

On what her family said when they heard she was dating an Indian When I first told them, they really didn't ask about him, but wanted a clarification as to what type of Indian. (*Laughs.*)

My brother lives in Montana and he thought Shwetak was native American. Apart from knowing that he was from India, my family didn't know about different castes, different religions, different customs, different regions in India.

They had some stereotypes about who Indians are; they knew some doctors in Ohio who were Indians, and it was a learning process for my family. They were pretty open. When they met Shwetak they realized he was just like me in many ways. So, they just went past that (*his background*) and didn't seem to have any problem with it.

He proposed to her at a ski resort in January 2009, near Mount Rainier. The two sat down on the side of a slope overlooking Mount Rainier.

He then popped the question (*he still had his snowboard gear on, so there wasn't much kneeling involved*). He didn't have the real ring yet, since his dad had just come back from India with it, so he had secret-



ly grabbed a ring from my jewelry box to propose with. Little did he know, it was actually a toe ring! How romantic!

Shwetak told her he had wanted to propose close to Mount Rainier, so that whenever she saw it from Seattle, she would always remember where they were engaged.

The two had an Indian wedding first, followed by an American-style wedding. The ceremonies were held on a decommissioned ferry boat docked in a Seattle lake.

On some things her family found surprising in Shwetak in the beginning

He being vegetarian was very interesting with my family. Growing up in the mid-West, it was pretty much a meat-and-potatoes culture. My mum has a number of recipes where she just puts bacon in or all sorts of meats in the dish. So just educating them (*her family*) on his vegetarian lifestyle was an important thing.

I've always been very sensitive to him being vegetarian. I don't eat meat when I'm with him and I've kind of graduated from it for kind of health reasons. I'm always educating them about Shwetak's specific dietary requirement; and yes, he is American like me, but he has these little different quirks about vegetarianism.

Another thing is that my mum was an English teacher. So, she really loves a lot of the clichés and idioms from English culture like 'the pot calling the kettle black,' 'killing two birds with one stone' and those sorts of idioms.

I realize that Shwetak didn't learn much of those idioms as I did when he was growing up. Often, he will take a lot of things that I say and what's true of American culture and true of the English language that he didn't really pick up when he was growing up and then ask 'Why would the pot call the kettle black? Do the pots even talk?'

As an American growing up with American parents who have been here for many generations, my experience with the English language is a bit different than that of Shwetak's who just didn't pick up similar









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year, what jobs they really want to look for. This is a way to go into a lot of detail. It could be over lunch, in my office, or in the lab.

The other thing I do is a couple of days in the week, I teach classes: It could be a graduate class, an undergraduate class and it could be on a variety of topics. That's my day job. Working with students throughout the day, that keeps me excited, keeps me motivated, working on what we do.

I also do a lot of things outside the university as well. I have consulting responsibilities where I work with other companies to commercialize technology. We are trying to commercialize our own technology. And so, roughly, a day a week, I work with other companies on that.

This is really an exciting way to take the work that we are doing in our research lab and making sure it has impact outside the lab and university.

How best have you been able to use the MacArthur Genius grant?

When I got the phone call about the award, they said it would be a life-changing opportunity and I really never understood what that meant.

Life changing! It's just an award! It's just a designation!

The only thing that changed is that I got this award.

I think one of the things that is apparent was the amount of perceived credibility I received. I am the same person, but the opportunity, the doors that opened, were just amazing!

Just weeks after the announcement of the MacArthur award, I received a call to meet the Secretary of Energy (*Steven Chu*) in Washington, DC; it was a meeting that I was trying to set up for months. But after the MacArthur award announcement, he had some time available and I had a personal meeting with him and that went great.

The best thing that came out of this is that all my students are benefiting from this (*the MacArthur Genius grant*). They are also reaping the benefits in terms of the opportunities that we are getting with meeting with officials and executive members of companies. I think we are taking advantage of these opportunities to see what else we could do with our work.

What is the enjoyment of being in the class like? How do the students challenge you and how do you challenge the students?

There are two types of interactions I have with the undergraduate and graduate students: These are formal classes where I interact with them; the other side is the advisement of the research students; these are my PhD students whom I'm advising to do their thesis and then eventually they will get their own PhDs.

On the classroom side, it is incredibly exciting. One of the things I have to do is to make sure that they don't get intimidated. One of the students came up to me and said, 'You know your class is very intimidating. What do I do in a class where a genius is teaching me?'

What does that really mean? You probably know as much as I do. Because my job is not just to give you the tips, techniques and skills to work on this problem, but to motivate you to work on this problem and be an inspiration for you to do well.

I need you to push me as I'm pushing you. What I often try to do is to try to revamp the curriculum a little bit, to make it really fun. We do a lot of theoretical work, book work. But that's only a very small portion.

A significant portion of the work that I try to

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'He has so much energy and it's just so infectious'

COURTESY: SHWETAK N PATE

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English from his parents. That's been a funny thing as well.

I've been doing a lot of traveling in my life, and it's something I love to do.

When I was younger, my parents took me on a lot of trips across the US by train, which is what got me started in my desire to take in as much of the world as possible. While in college, internships took me all over the United States, and while in grad school, conference travel and research internships led me to various countries across four continents.

I hope to visit all 50 states — I'm at 48/50 now — and all seven continents — I am currently at 4/7 — at some point in my life. I'd also love to see all the Seven New Wonders of the World — I currently have seen two: The Great Wall and the Coliseum.

Now with the baby coming, we should be planning to visit India.

I want our child to know of its Indian heritage, too, and surely some Gujarati. ■

— Arthur J Pais







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do in the classroom is actual projects that they have to apply to and really make it an exciting opportunity.

Instead of me pushing them, the students end up pushing themselves.

I realize what I need to do has been successful is when they realize that the things that they are doing is self-motivating. That's kind of the curriculum I try to set up

up. You are very young; but you look younger than you are. If you were in the movies, you would be described as a hero who never grows up. So, as a teacher, is it difficult to make an impact on the students?

People always say to me that I look really young, like a graduate student, even an undergrad, not like a professor. Some even

mistake me for a high school student. Some ask how hard it is to get students to really trust you or treat you like a professor. Actually, I think it is the opposite. It's actu-

ally easier for me to engage with the students. There are a couple of reasons for this. One is the feedback that I often get and I always make sure that I am very approachable. Students often say I am very approachable, which may actually be because I am closer to their age or look closer to their age.

Whereas (on the other hand), if I were older, for example, a lot of students say it is kind of intimidating. In a way, this is actually a great opportunity to get a different kind of respect. They can come to me anytime and can speak their mind. I use that to my advantage. I don't think it's been a problem; it's actually been an opportunity.

What do your students call you?

They can call me anything. I don't particularly like to be called Professor or Dr Patel. They call me Shwetak. It's all on a first name basis, which is common in computer science.

If it's my PhD students, or undergraduate research students, or students in my classroom, I encourage them to call me by my first name.

They're not just my students, they're my colleagues, right?

I am a mentor while at the same time I want them to be treated as colleagues so we are on the same footing. We can actually engage in dialogue that transcends the roles that have typically been set out, of a professor and a student

Did you ever feel you had to shorten or change your first name? Did people ask you to change your name?

People have always tried to come up with an alternative pronunciation of my name. But early on I just made a decision that I'm not going to change my name, I am not going to have a different nickname.

If people pronounce my name properly or try to pronounce my name, then I know that they are taking it seriously and they care. So, I actually never decided to change my name. I just said well that's how it's going to be.

Do you enjoy being interviewed?

The MacArthur announcement came out in September 2011. The interviews started to reduce around Christmas. September to December was ridiculously crazy — press, inter-



Inside Dr Shwetak N Patel's lab. Among his inventions is the Infrastructure Mediated Sensing, which can detect noise on electrical systems to monitor the energy usage of specific appliances and electronics in homes

views, and university events. It started to calm down a little bit; but then in February it started to ramp up again.

They said it will keep going, maybe for a couple of years. It's OK as long as I can manage it and the schedule. But it is still fun and it is always great to talk about our research, the university, etc.

Now, the interviews are getting more interesting. A lot of the initial interviews were about the phone call that I got. What am I going to do with the fellowship?'

Now, there's a different spin to it. 'How did I grow up, what is my philosophy in life, why did I become a professor, what classes do I teach, and so on.

My sister and my wife (*who is also a professor at this school*) have made a really good scrapbook. They found all the articles on me, cut them out and made a big scrap book over Christmas.

We are expecting our first baby in October. We are trying to come up with a unique name that also sounds Indian. I am going to give the book to the kid. That's one of the things I think about all the time: How do I explain all this to my about to be born kid?

What was it like growing up in Alabama?

When I was growing up, we traveled a little bit. So, I got a sense of what the other parts of the country looked like.

I never really thought: Now here's the South, and how it's different from the rest of the world. I don't think it was limiting in any way. It was pretty exciting. I was able to do a variety of different things that anybody could have done anywhere in the country.

I grew up in Birmingham, Alabama. Birmingham has a lot of people who have moved there from other parts of the country. There are a lot of transplants there. I was exposed to a lot of different cultures and opportunities and a lot of different ideas because there is a significant mix of a lot of different backgrounds there.

I also went to a high school that was slightly different where there was a mix of different people as well.

What were the challenges growing up as the son of an immigrant?

Being first generation, there are a lot of cultural challenges. At home, we had a lot of traditional Indian culture and religious beliefs; and, outside it is very different: A very different culture, a very different set of cultural norms that you have to deal with.

But at the same time, it's an interesting opportunity because you can see what the two different cultures are, (*not only*) what the differences are between the two cultures, but also the excitement of adopting them both.

I grew up being bilingual. I'm the oldest; my brother is in the middle and my sister is the youngest. It was a way for my brother, my sister and I (*not only*) to be able to convey different ideas through different languages, but also using different cultures to really expand what our view of the world really was.

We became very open minded as a result. This should be (*the case*) for anyone growing in any country.

What was your dream when you were growing up?

I do a lot of presentations for middle school and high school students. The story I always tell is that when I was growing up, I wanted to do a lot of things. I really did not know what I wanted to do although I wanted to be an inventor or scientist, and being a scientist is a pretty nebulous concept.

So, what *is* being a scientist? I wanted to be an inventor, but I didn't quite know what that meant. I just knew that it was something that you came up with a new idea and people would use it.

If you ask my parents (*who ran a motel*) they wouldn't have guessed what I wanted to do until the very end. I could have become a mechanical engineer, a civil engineer, a computer scientist, electrical engineer; I could have gone into medicine.

But when I was little, I really liked to build things; I liked to take things apart and reconstruct them in different ways.

My parents often spoke about me not being able to sit in one place doing one thing, but running around and doing a lot of different things; and a lot of it was around constructing new ideas, new devices and building things from scratch.

As I got older, I think in middle school, I started to realize that computing technology, the computing revolution, was really fascinating.

At that point, I really didn't know if I was going to be a computer scientist or electrical

















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engineer. I did a little bit of both.

I ended up writing my first computer program when I was 6 years old. Later, in junior high, I started to really focus on technology.

In retrospect, I really didn't realize what I was thinking about until many, many, years later. What I was thinking was that computer science, electrical engineering, and computing in general was going to have a big role in the future. I didn't know what role that was. But I started to see how computers were everywhere already.

Computers were in our classroom, people were starting to learn about them, we were starting to learn more about the Internet. Every automobile had a computer. Everything had a computer in it. That's when I started to say this seems like a really fun area where if I start to do something around in computing technology, which is also going to have an impact in a lot of different areas.

Luckily, when I went to undergrad and grad school in computer science, I realized that that was actually true. Computing technology was having an impact in many different areas.

Being the first born, especially of immigrant parents, did you have a choice in what you wanted to do?

The most valuable thing my parents offered me in terms of my career was they said I could do whatever I wanted. I didn't have to do the family hotel business; I didn't have to be a doctor, or lawyer, or engineer. They basically said you should do what you enjoy the most.

I think that's the best thing they could have done, because that allowed me to explore.

Being the first born, that was *big*, that was *huge*, that was very valuable for me; to allow me to do whatever I wanted in college and as a career.

At the end, what happened was that they were equally very supportive of my brother and sister and they were able to see what I wanted to do and they went off into their respective fields.

I ended up doing computer science and my brother graduated with a PhD in chemical engineering. My sister is in medical school and going to be a doctor and also going to focus on research.

Are your parents still running the motel business?

Yes. I told them they don't have to do it; I told them they could retire. But they said they would after my sister graduates. They still feel an obligation to help us out even though they don't need to.

Speaking of life lessons, what are some of the most valuable lessons you have taken from your parents and teachers? What incidents do you remember most?

One of the things they taught me was ways to be happy. That's something people always struggle to figure out.

The little things that you overcome are the things that you really need to appreciate; and getting a PhD, is an incredibly stressful and hard time. We have a really typical qualifying process. The thesis process in general is really hard and very uncertain. You don't know what's going to happen at the other end of that process. Those are big hurdles that I had to get past.

My parents taught me that these hurdles are going to happen in life all the time and when you get past them you don't want to just discount them and say I accomplished this and (*get*) on to the next one.

You really want to take a step back and reflect. Those little things you have gone past — and no matter how simple it is, you want to be able to embrace those hurdles and be able to learn from them and appreciate what you accomplished.

Family was another thing that they really harped on. Early on we had to do all these family gatherings. What does that really mean? Later on, you realize that your friends and family are basically your social support and that's what's going to make you happy as well.

Being family oriented was very valuable and that was something they really pushed on us. That totally makes sense now, growing up and seeing when I am starting my own family.

Happiness starts at home — this is something they really encouraged to think about and instilled in us.

What was your parents' reaction when you told them you were going to marry a Caucasian woman?

They were incredibly supportive. Everybody in the family was incredibly supportive. That was great for us, the family and everybody else.

My parents are definitely conservative and open minded at the same time. They appreciate Indian culture and want to keep it as much as possible, and for a good reason, right?

They have an interesting balance of the two cultures, Indian and



A young Shwetak in the kitchen. He was and still remains close to his family

American, which is really hard and they have been able to succeed. They were able to not lose the Indian culture while at the same time absorbing American culture.

They were able to be not too conservative and not be too open so that the cultural traditions were not lost.

Have you thought of what your child will inherit from you and your wife?

Yes, a little bit! I think the values we can offer our children is openmindedness. *That's* the most valuable part of what we can offer.

We come from very different heritages, very different cultures and backgrounds; and that open-mindedness is going to be very valuable for that child moving forward.

As a result, we will try to teach them multiple languages, give them exposure to multiple cultures, backgrounds. I want them to experience that, first hand.

Professor and inventor Amar G Bose once said teaching electrical engineering at MIT was only a part of his work. He was also very keen on teaching his class to think critically.

The field is moving fast, especially computer science and electrical engineering. Every six months, there is something different. It is hard to teach a particular concept because six months from now, they will have to learn a new concept. But critical thinking is definitely important.

One of the things that I like to focus on is confidence. Confidence is the most valuable tool or piece of information that they can learn because confidence is how they are going to get through different challenges in life, be it an exam, a research problem, a project they are working on or just something else outside their career. I have seen a lot of students initially struggle, but when they start to

I have seen a lot of students initially struggle, but when they start to get a little more confident they shine in the end. The skills will come over time. Part of the education system is to teach them how to absorb more skills and let them teach themselves, but I think confidence is the most critical component that I try to impart to them.

We spoke about the life lessons that you learnt from your mentors. Tell us something you have learnt from your students.

I think the general lesson I have learned from my students is reaffirming. One of the things that excites me about being a professor is the ability to not just impart knowledge, but also to see them go out and be successful and to be able to know that you helped them make some of these choices and helping them make their first leap into their new career.

You really want to focus on what their passions are and make a connection to what they are excited about. Often, I have my own ideas on what to do for research or a project, but actually the more valuable part of mentorship or educating graduate students is figuring out what their ideals and passions are and trying to tap into that and trying to create a project around that.

Often a student is pushing me in new directions because it's what they're interested in. Often people ask where's your research heading?







Amazon.com founder and CEO Jeff Bezos, left, in Dr Shwetak N Patel's lab at the University of Washington



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I say I don't really know; my research is heading where my students are going. They could take me in this different area that I never thought I would go into because that's where they really wanted to go.

When you do the outreach work with students, do you discuss your own life?

When I do K12 outreach work, I talk to hundreds of middle and high school kids a year; maybe even thousands, depending on the year and the venue. I've given talks to high school, middle school kids in Seattle, in Los Angeles, wherever I go. I try to share my story with them.

Usually the title of my presentation is 'How to make having fun into a career.' How what I did when I was really young, I am basically doing now and made a career out of it. I tell them about the different projects I worked on when I was little, what I did as I was growing up.

I went to a normal elementary school, middle school, junior high. But I did go to a magnet high school, which was still a public school, though. I was fortunate there. I went to Georgia Tech and now I am a professor at the University of Washington. These are great schools, but I learned that it is not always where you go, but what you do with the opportunity you have.

This advice I give to a lot of parents who are trying to help their sons or daughters decide on schools. Going to a great school helps a lot. You get a lot of credibility, get the contacts with people that you might not have otherwise access to.

It doesn't always matter what school you go to. What matters is what you do with the opportunity. You don't have to go to the absolute top tier school to be successful.

It's the opportunity that you are given and what you do with that is what is going to dictate how you end up being as a person or how successful you are.

Another thing I talk about is don't be afraid to ask for help early on. If you start an undergraduate program and want to do research,

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it's OK to go to a professor and say, 'I want to do research. I haven't quite taken the classes yet, what can I do?'

Being proactive is something that is incredibly invaluable.

Are there times you feel you could be more confident in your own work?

It happens all the time. The biggest critic is always you. That's why you want to be put in environments where you getting relative feedback, to make sure you are getting the mentorship that you need — to get the feedback that says look the thing that you're doing is absolutely right or you're moving in the right direction.

You have to make sure you set yourself up where you have people that you can really trust and mentor. This could be everywhere, from your family, your friends, your siblings, to your colleagues.

I've been incredibly fortunate to have amazing mentorship throughout my career at the academic level, the career level, at home. That is what's helped me continue to move forward.

And that's something I want to do with my students. I want to be able as a professor, a mentor, an advisor, to provide the level of feedback to give my students the confidence. This is just one little piece of that entire chain of mentorship that you will get and I think you need to have that across the board.

Were you ever told by a teacher or two that you are underestimating yourself?

When I was growing up in Birmingham, there were not a lot of immigrants in my school. I was always different, but at the same time, I was always treated as an equal. All of my teachers were very supportive.

When I was in kindergarten, my teacher had the first opportunity to push me. This was a really challenging time for me because I was bilingual and was actually learning English really well, but it was something that she really pushed me a lot on.

Kindergarten was really invaluable. I remember my kindergarten teacher to this day.

When I started to move through the school system, I think it was in junior high, when I started to get pushed in a lot of different areas

My technology teacher was really invaluable, allowing me to do a lot of things myself. I think he realized that I knew a lot of concepts that maybe he may not have known. He allowed me to explore them myself.

All my math and science teachers were just great. They realized that let's start to push him in new ways and let him do things that are beyond what we typically teach.

My high school was a magnet high school with students from all over the county coming to one school. That was a very different kind of challenge where everyone was incredibly smart and talented. Everybody had very different skill sets and backgrounds and interests, but the thing is that everybody ended up going to college and they were all going to be successful coming out of high school...

That was a very different kind of challenge and we got pushed in other ways. We were encouraged to do research and explore. I remember doing a lot of computer science work when I was an undergrad, being able to do undergraduate research when I was at the university.

Philosopher and mathematician Bertrand Russell wrote about being unhappy about the things we don't have instead of being happy about the things we have. From your personal life, tell us about things that make you happy, unhappy and how you strike a balance between the two.

Happiness is a hard thing to put a finger on. But it's the things that you appreciate you already have. It's hard to do that, right? Because you see so many things going on and you wish you had something else and I don't think that's the right philosophy.

Appreciating what you have and what's personal to you. Like many people I struggle with

▶ M80



State Farm

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that too: Being an engineer, a professor, an entrepreneur, a computer scientist. It seems like I want to solve a lot of the world's problems. I can't solve everything.

I always get frustrated or unhappy when I can't do everything. I think that's life. We are designed not to be able to do everything. We can only focus on a handful of things and the things that you focus on are the things that you can do well.

It doesn't matter if it's something really simple, whatever it is, do what you do, that you're passionate about, well. Even if it's a very small thing.

What are some of the most difficult decisions you have had to make in your personal life and your professional life?

In my professional life, I had to decide what to do when I graduated; this is something many students struggle with. Right now, a lot of students are graduating and trying to figure out what they want to do and that's an incredibly hard challenge because you have professors, you have students, you have industry, you can build things that have a global impact.

I'm very fortunate to have a faculty position. This is really hard to get these days. That opportunity was there. At the same time, I had to decide: Do I become a professor, or do I go to industry. A lot of times you have difficult decisions (*to make*) but the decisions that you make always end up working out because you've embraced the decision you've made.

You can't look back and say I should have done that or the other thing. You look forward and keep looking forward and that's where a lot of the hard decisions that I had to make actually do the best, because we look forward.

Being an immigrant's child, there were a lot of cultural and traditional challenges and this is something we had to struggle with. Julie's (*his wife*) family had a very different set of ideas and we had a very different set and if you combine those together, it's not an easy mix, right?

There were a lot of challenges in trying to come up with a balance between the two. The families were supportive and this organically evolved and it is a lesson that a lot of people can learn from.

The wedding itself was yet another surprise. There was a very different challenge and don't forget that culturally Indian weddings are very different from traditional American weddings. So, we actually had a hybrid wedding and it worked out very well.

In fact, it was really great for all the guests to see a variety of different cultures coming together because this was a very good educational process for them and for a lot of other friends who are doing dual traditions and are learning from it as well in terms of how they could do something like this in the future.

But it was a hard thing. Do we prefer one over the other, how do we do a mix of the two, do we come up with our own ideas? So in the end, it was a hybrid wedding. It was a great experience not only for us, the families, but also for everyone.

Describe the hybrid wedding.

We had an abridged Indian wedding. We did the traditional going around the fire seven times.

Then we had an intermission where Julie, the family and I switched from Indian garb to traditional Western garb. She went into her wedding dress and I into a tux...

Then we did the more traditional American



Shwetak, center, with, from left, father Naran, brother Shrayesh, sister Shweta and mother Kusum during his wedding

The Innovator

wedding towards the end. We had a single reception where there was a mix of Indian and Western food, a lot of different cuisines. This was actually on July 4. So, by the time evening came, in Seattle, we had the Seattle fireworks in the end. This was more of an American tradition. This was a hybrid of everything in one night.

What are some of the things you do outside the lab and class?

I am a very outdoors person. My wife, Julie skis, I snowboard. Being in Seattle it's a great opportunity because we don't have to worry about the snow in Seattle, but only have to go an hour away to get great skiing and snowboarding. Hiking, running, that's something we enjoy.

When I was young, I liked tinkering. I work on cars, electronics, woodworking and that's when I have time to work on them. In my garage, (*there are*) whatever tools you need to work on, any kind of project, be it electrical, be it mechanical. I like doing all kinds of projects in my garage.

My wife and I like to do gardening. This probably rubbed off from my parents who are avid gardeners. They have half an acre of a garden. Our chores when we were little was not only helping with the hotels, but also helping cultivate the giant garden.

We like to travel. We have the opportunity to travel to a lot of exciting places because of our work. But, as a result of that, we also get to piggy back on that and do all other kinds of travel.

For example, we went to Bora Bora for our honeymoon. One of the things that my wife and I try to focus on are experiences; because experiences are the things we remember for a lifetime whereas buying something new will wear off in a few months. Tangible items are fun initially, but it's the lifetime experiences like travel that last a long time.

My wife and I have gone to Japan. In fact both of us have interned in Japan. It's great to go to a different part of the world just to see a new cultures and traditions.

That's when we realize that there are a lot of things that we can do in life, not just what we learned when we were growing up but borrowing and choosing from various different cultures and creating our own philosophy on how we are going to raise our kids and how we are going to live our lives. We stayed with a Japanese family for our internship in Japan. The culture, how everybody takes care of one another, in Japan was just eye opening. This is something we noticed when we were in Japan and looking at some of the recent disasters, there was no rioting or looting. People actually came together rather than trying to break apart. This is something that's culturally in them. That is something that they just do.

Food is a very big thing when traveling because everybody has very different cuisines. Going to the night market in Beijing was very interesting because I never really knew that these cuisines actually existed. I've heard stories, but it wasn't until we saw the things that you can find in the night market like ants and bugs, things that are not traditional in Western culture.

I'm vegetarian; my wife is vegetarian at home. She is non-vegetarian outside of the home every now and then at a restaurant. I try my best to be a vegetarian when I travel, but it is very hard. In fact, in Japan, Korea, and China, it was really hard. But, things have changed across the globe. Now, it's not unheard of to find vegetarian options when you visit a place. You have to do a little bit of research ahead of time before you visit a place about vegetarian options.

What are some of the fears you have as a person or as a parent?

We're in an age when we have access to lots of information and so the challenge here is that we're actually inundated with information. The question is what do we do to sift through all of it? Everything is now digital, we have to access books etc online, the media has really changed the way it has disseminated information.

My fears are how do you go through all this information and pick out the relevant information that's going to be valuable? You can easily focus on a very small subset of the access of information that you have, but how do you know that's information?

So, what is the balance of having a child to look at things that are online, versus reading in a book, versus having all the access to information that he or she might have.

So, that's one of my big fears right now. It's also an opportunity though. The flip side is that we do have access to information that is invaluable. \blacksquare

















Incredible India



'He did not become a genius overnight'

His parents and siblings share rare memories of Shwetak in conversations with **Arthur J Pais**

aran Patel had no doubts that his eldest son would sooner or later have taken to invention and yet he has wondered from time to time if Shwetak would have started so young but for a computer a long time guest at a motel the Patels owned in Birmingham, Alabama, had left behind.

The man who had no family died of heart failure in a local hospital and had entrusted his possessions to Patel, including an IBM computer before going to the hospital.

Patel did not know what to do with the computer. In fact, he will tell you that he did not know how to use one.

"We did not have a computer at home or in the hotel," he remembers. "Twenty years ago, you did not really need a computer in your home or to run a small motel or a hotel."

Shwetak, a hotshot inventor today, a MacArthur Genius and a professor, was around eight at that time, and he had been asking for a computer for some time. But it did not occur to the father that his son could work on a computer and put the IBM machine to use.

A technician working for the hotel told Patel that the IBM computer was nearly useless, but offered a 'good' computer in exchange. Patel should have known better and he should have certainly consulted a family friend. Or perhaps he could have checked with Shwetak. After getting the 'new' computer, he thought

Shwetak was not in a hurry to use it. But the next morning or so, Shwetak got up, went straight to the computer and started using it. "He said he had dreamed about it all through the night," Patel said. "It was like he had a vision, showing him how to use the computer. For there were no computer class-

es for boys of his age at that time." Shwetak also knew something was not right with the 'good' computer. Seeing his son's passion, Patel decided to buy the boy a new computer, but this time, Shwetak went with his father.

"Soon Shwetak was helping to fix his teacher's computers," Patel adds. "I even asked him, 'Are you going to school to study or fix the computers of the teachers?"

Naran and Kusum Patel came to America with professional degrees from India and worked for a company for a few years before deciding to open a motel, first near Selma in Alabama where Shwetak was born, and then in Birmingham in Alabama.

"We noticed right from the beginning that Shwetak was self motivated," says Kusum. "We did not have to tell him to study well and get good marks. We were lucky our other two children followed his example."

Shrayesh, who is four years younger than his brother who was born December 9, 1981, will have a doctorate in chemical engineering next



Shwetak N Patel's interests have always been varied - science, arts, sports

year from the University of California, Berkeley.

Their only sister Shweta is following a medical career course at the University of Alabama in Birmingham and has been a member of the University Honors Program.

She is also a researcher investigating the role of natural compounds in breast-cancer prevention.

"It was fun growing up with two older brothers," she says. "I am small made compared to them, but I played basketball with them. They made a few exceptions for me, in the sense if the ball reached a certain point, I would get a point."

Shrayesh is amused by her account. "We were scared of her," he says. "I think we were nicer to her, but between Shwetak and I there was always this good-natured competition. He did not like to lose to anyone, especially in video games. And we played a lot of those video games together. There were times he would reset the game!"

When he was in the seventh or eight grade, Shwetak had begun winning a lot of prizes; he even built a robot for a school project.

"I realized he had something special in him," Shrayesh says. "He is very much like my father who is always busy. In the motel business, you are busy 24/7, but even otherwise my father would be ever busy with his hands, and so is Shwetak. If Shwetak was not tinkering with computers or working on class projects, he would be working in the family garage. He always enjoyed physical activities."

Shwetak has said he has always enjoyed tinkering with things — wood, cars, and electronics.

His first computer program in third grade was for a race car game, according to *The Birmingham News*. By the time he was in fourth grade, he moved on to applications that required more electronics.

He excelled in science and the arts.

Beth Tanner, his Spanish teacher, told *Birmingham News* that Shwetak 'attacked every subject with intensity.'

'He is one of the smartest students I have taught, and I have had many students who have been very smart,' she said last year. She also said she remembered one of his inven-

rts COURTESY: SHWETAK N PATE

board. Shwetak describes it as an 'anti-gravity levitation system, complete with solid state aircraft.' It was battery powered and did not require a propeller, he said. He won the sci-

tions from a high school science fair - a hover

ence fair that year with the device. The Patels remember telling their children that they had to choose between college and running the hotel.

"Shwetak was in middle school and his siblings were very young, but I got them to join us in the discussion," his father says. "All three said they wanted to go to college."

He believes the best thing he and his wife have done for their children is "to let them be." When they knew the children were self motivated and disciplined, everything was going to be alright.

"We did not have to tell our children, this is right or this is wrong," says their mother. "They knew that in their hearts from very young age."

"Shwetak was far ahead of his class," his father continues. "Naturally, he was bored in class. I asked the school if he could jump a few classes, but at that time in Alabama there was no provision for such a thing. But when he went to college in Georgia, he could do it (*take a bigger load of courses and get his first degree in three years*) He was a big role model to his brother Shrayesh and sister Shweta who is three years younger to Shrayesh."

Shwetak and Shrayesh collected baseball mats during their school years, but did not have a box to keep them. So they dumped them in a cupboard. One day, Shwetak looked around and found a few scrap items in the house, soon he got a few things from a shop, and within hours he had created two elegant boxes which could easily be mistaken from having been brought from a store.

"He did not become a genius overnight," Shrayesh says. "He had big confidence in himself, and that has helped him to be an overachiever."

When he was little, Shrayesh remembers his brother telling him, You cannot know everything, and it is impossible to know everything, but you must have confidence in your work and you are not going to fail then?