



PREDICTING



Kira Radinsky, 27,
was recently selected for
MIT Technology Review's
list of leading global
innovators under 35

COURTESY

IMAGINE SOMEONE who comes to Israel as a small child from the Ukraine, studies computer science at the Technion-Israel Institute of Technology at the age of 15, wins the coveted Israel Defense Prize at 19, in-

terns at Microsoft, earns a black belt in karate, discovers how to predict the future from web archives, acquires 10 patents, marries, completes her PhD and launches a promising start-up – and all by the age of 27. The

stuff of fiction, you say?

But no; she is Kira Radinsky, and she is real.

Despite her crammed schedule, Radinsky agreed to an interview, which offers a fasci-

THE FUTURE



nating glimpse into the minds of the gifted, from whom we all receive many gifts – creative ideas that enrich our lives. For example, she and her colleagues developed software that found a causal link between Arab

dictators, a sharp rise in the price of bread, and social protest and unrest, thus predicting the so-called Arab Spring. Despite all this, in the interview below, she describes herself as “ordinary.”

The theory of Black Swan events, by Nassim Nicholas Taleb, describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of

hindsight. Black swans were believed not to exist – until, surprisingly, some were found. Your work (“Mining the Web to Predict Future Events”) suggests that Black Swans are in fact mostly white. How do you respond to Taleb’s best-selling book and argument? Because, if Taleb is right, we need to develop flexible and fast ways to respond to unpredictable events, like the 2008 global financial collapse. But if Radinsky is right, we need to work harder to prepare for events that data mining shows are imminent.

“Cuba witnessed a cholera outbreak recently. For the Cuban people, this was a Black Swan, considering that the country has not had a single case of the disease in over 120 years. Yet our system was able to predict this outbreak ahead of time. This is

rate), served in the security services. How did your parents relate to your giftedness? How did your parents influence your life choices?

“I grew up with my mom and aunt; both are academics with graduate degrees in math and computer science and have high work ethics. My parents arrived in Israel in 1990 and had to rebuild their lives from scratch. My mom worked in three jobs simultaneously but always found time to drive me around to all my activities and to encourage me to do the things I love. She always found ways to pay for those activities and came up with creative solutions for issues that arose. My aunt and mom gave me a great example on how to pursue things that I want, to embrace changes, and to enjoy myself.”

At some point, I came to realize there is so much untapped data that can be leveraged in amazing ways. I never really stopped to think of how difficult the problem would be. But maybe that’s a common behavior for ordinary people trying to achieve extraordinary things.”

You are clearly very, very smart. Research shows that there is a low correlation between creativity and IQ, but a high correlation between creativity and motivation. How do you get your ideas, and once you have them, how do you implement them? Leonardo da Vinci had many ideas, but very few were actually implemented.

“A lot of my ideas come from exposure to different ideas and from interaction with my husband, Sagie Davidovich [vice president responsible for R&D, at SemantiNet, a start-up]. We both read a lot about new technologies, blogs, developments, and listen to lectures together. Many times, we just sit and brainstorm together, and share the excitement from the new things we discovered that day. This is where inspiration reveals itself.”

MY TRUE PASSION IS ARMING HUMANITY WITH SCIENTIFIC CAPABILITIES TO AUTOMATICALLY ANTICIPATE THE FUTURE BASED ON LESSONS FROM THE PAST

not to say we can predict any event, but I definitely argue that some Black Swans may be whiter than they appear. I believe that many events can be predicted and understood, given the right data and mechanisms to extract reason from this data.”

ACCORDING TO MIT Technology Review, “Radinsky’s software... essentially read 150 years of news reports and huge amounts of data from sources such as Wikipedia, and spotted a pattern in poor countries: Floods that occurred about a year after a drought in the same area often led to cholera outbreaks.”

Can you tell us anything about why you won the Israel Defense Prize, for the intelligence wing of the Israel Security Agency (Shin Bet), when you were only 19! Were you the youngest ever to win it?

“I can’t really comment on that beyond saying that I was fortunate to work with extremely talented people at a young age and make my small contribution to the security of Israel.”

You are clearly a highly gifted person and began Technion studies at age 15. Yet you have a normal life, played sports (ka-

DR. ERICA LANDAU, Israel’s top expert on educating the gifted, passed away on August 5. She was 81. A Holocaust survivor, she chose to forgo having children of her own, yet dedicated her life to helping the children of others. In 1969, she founded the Young Persons’ Institute for Promotion of Creativity and Excellence in Tel Aviv. Among her alumni are former finance minister Yuval Steinitz, former Air Force commander Eliezer Shkedy, Better Place founder Shai Agassi and author Etgar Keret. She insisted that “gifted children should live with average children,” as did Radinsky. “When a child asks something... he should be asked back, ‘What do you think?’ The purpose of education is not to know, but to experience,” Landau once told the Haaretz daily in an interview.

I am an economist. We economists can’t even predict yesterday’s weather. You chose a super-difficult subject for your Ph.D. thesis, “Learning to Predict the Future Using Web Knowledge and Dynamics.” How did you get the idea for this topic? What made you believe you could succeed in solving such an extremely hard problem?

“I became fascinated with the idea of predicting the future at a very early age.

Based on your own experience in local schools, how must Israel reform its schools so as to foster more creativity and less memorization?

“I studied in Israel only, going from elementary to high school in my hometown, Neshet. My personal experience with the Israeli education system was actually great. I was fortunate to have amazing educators and participate in many programs that fostered curiosity. I have excellent memories of my elementary school teacher, Baruch Yaakobi. He encouraged our natural curiosity, organized competitions, was strict, but also provided us with tools for how to learn. I remember he organized enrichment programs in which parents taught us.

“One of the main tracks was around genetic engineering – and I was extremely fascinated by it, especially as it was at the time Dolly [the first mammal ever cloned, in 1996] was cloned. I wrote an entire paper about it, which Baruch reviewed. I think it’s fantastic how we would write papers in elementary school, with Baruch walking us through the research process. He guided us from the first question all the way to structuring the final answers. Each one of us picked subjects we loved. We had very tough exams as he did not give us any dis-

counts. I'm very grateful for this and consider it an example."

YAAKOBI IS an example of the crucial role gifted teachers can play in inspiring gifted children. He went on to become principal of a moribund elementary school in a poor Haifa neighborhood, Ein Hayam, and revitalized it with a simple idea – teaching children through playing games to learn Bible, arithmetic and history.

Radinsky recently co-founded SalesPredict, whose software helps salespersons identify and focus on the right opportunities (not just leads), using machine learning and data mining. Her start-up has venture funding from leading VC firms. She serves as its chief technology officer.

What brought you to launch SalesPredict and struggle to build a start-up, rather than pursue an academic career – you were a prizewinning teaching assistant at the Technion?

"I believe it's my strong desire to see my ideas implemented in the real world and be personally involved with the implementation. I intend to be the Indiana Jones of Predictive Analytics. Seriously – I really enjoy combining research and practice."

Your web-search algorithm is based on Bayes' Theorem, a mathematical formula that adjusts our subjective probabilities of future events based on ever-changing data from the past. I see a possible problem with this. Briefly, risk means we do know the odds; uncertainty means we don't know the odds. Deep uncertainty means we don't know the odds, and they are constantly changing anyway. If the world is largely characterized by deep uncertainty, can we truly rely on past relations to predict future ones? Will they mislead us?

"'History doesn't repeat itself but it does rhyme.' [Mark Twain]. The probabilities are always changing, but some patterns, if we abstract them correctly, always remain. And if we incorporate the most recent information, we can learn about new patterns emerging all the time. Think about how children learn – they receive reinforcement from the environment and learn patterns. This is also how we [adults] learn. I would say the work I have done is not about predicting the future; it is more about making deep analysis of probabilities of future outcomes based on what we have seen, just as an expert in the field would do, if he had the time to look at

all the available data in the world."

You have a PhD, 10 patents, two start-ups, leading publications, a karate black belt, three years of army service. Kira, do you have time for a social life? Are you enjoying what you do, or is the stress excessive?

"I'm very happy and thankful about my life right now. I like the high pace and, while this may sound weird, even the stress. And yes, I do have a social life and also my personal friends I wouldn't give up. I think I learned at some point that in order to accomplish all the things I want, I need to be very efficient with how I manage my time. There are things I give up, for sure. For instance, you will rarely find me taking a nap on a Saturday between 14:00 and 16:00. But I can't be happier with my choices and with my life."

Do you have advice for other young people who are also gifted?

"My best friend in elementary school said something really smart in Bible class when we were 10, 'Everyone needs something to believe in.' And that is my advice – have faith and work hard for it. Imagine yourself at the end of the racetrack and don't think about how hard it is to get there, even when you are out of breath. The harder it will be to get there, the greater the feeling it will be at the end."

Kira, what is your next big idea? Research by a Dutch sociologist, Geert Hofstede, shows that Israel and Israelis are among the most short-term present-oriented people in the world. We live for today. Can your web-search algorithm provide Israel with a useful tool for predicting future dangers and risks, and preparing for them, to foster long-range thinking and planning? Forty years ago, in the Yom Kippur War, Israel paid a heavy price for its strategic blindness. I believe the new head of the National Security Council, Yossi Cohen, should be keenly interested in your future-predicting algorithm.

"The predictive algorithms are general purpose, in the sense they can be used to predict a variety of events given the right data. As for me, I'm very committed at the moment to the success of SalesPredict, my start-up. I want to see this project through. In the future, I believe predictive analytics can be incorporated into everything we do – including predicting mental and physical diseases based on our search behavior."

Of the many huge benefits that your future-predicting algorithm can bring to humanity, is it really worth your energy, brainpower and creativity to develop a tool to help salespersons identify promising opportunities and optimize sales? Surely there are far more world-changing applications?

"This is a fair question and thanks for bringing it up. I would say this. First, I'm extremely proud of what we are doing with SalesPredict. It's at variance with how business-to-business [selling] is done today. We empower businesses with predictive analytics capabilities that give them the ability to close better and smarter deals. We mine large amounts of data and correlate it with the specific business we are optimizing – all automatically without any intervention of a data scientist. We are excited to hear from our customers that we have already boosted their sales pipeline. Second, I would love to answer this question again in five years to explain how this is a crucial step to building world-changing applications."

THE LATE Erica Landau gave world-famous seminars on creative thinking. On her website, she wrote, "An up-to-date innovative society needs conscious, daring, creative, flexible and self-actualizing individuals. Imaginative fantasy is as important as goal-oriented rational thinking... We need this attitude in the very frequent crisis situations in our present life. The future might find us unprepared; therefore, we must learn how to create new ways, new reactions, new solutions."

Many of these new solutions will perforce come from the gifted, like Kira Radinsky, who was recently selected for MIT Technology Review's list of leading global innovators under 35 – a list that in the past included Facebook founder Mark Zuckerberg.

"My true passion," Radinsky told the MIT Review, "is arming humanity with scientific capabilities to automatically anticipate, and ultimately affect, future outcomes based on lessons from the past."

Radinsky and her colleagues, for instance, work with hospitals to predict the outbreak of epidemics, with 80 percent certainty, so that medicine and inoculations can be readied in advance. In a world, and especially a Middle East, fraught with nasty surprises, if she succeeds, there could be no greater gift. ■

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