IEEE TECH FOR HUMANITY SERIES »»»

William Hurley ("whurley")

Bringing Quantum Computing to the Masses

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Q&A with whurley, chair, IEEE Quantum Co
Working Group

1. What is your vision for how technology will bene

I'm eternally optimistic about the positive effects technology wi
Too often people envision dystopian futures where technologie
intelligence and quantum computing have hurt, rather than help
think we live in the greatest age. Think of the wonderful things t
today and the mind-blowing things that will be possible in the n
help of technology. I envision researchers using quantum comp
and tailor new drugs, find solutions to the causes and symptom
change, and most of all to analyze the incredible amount of dat
around which may contain solutions to some of the world's gre

2. Can you give a quick description of what quantu
and its current state of development?

Quantum computers take advantage of quantum-mechanical p
superposition and entanglement to (theoretically) execute certa
exponentially faster than today's computers. 2017 was a signifi
of quantum computing. IBM simulated a 56-quibit (quantum bit
processor (the previous record was 49) and then went on to de
qubit quantum computer. Google apparently came close to den
"quantum supremacy," the point at which a quantum computer
classical computer at a given application. Microsoft released a
Studio and Q#, a new programming language for quantum deve
countries announced significant new investments in quantum r
development. So I would characterize the current state of devel
advancing rapidly.

3. From improving traffic to helping discover vaccir
lot of applications of quantum computing. What ap
quantum computing are you most excited about?

I'm excited about so many possibilities. If I had to pick my top t
would say powering advanced artificial intelligence; meteorolog
and battling climate change; and next-gen cryptography, specifi
computing will impact things like blockchain and bitcoin.

4. When do you predict the consumer will see the ir quantum computing? What are the barriers to seeir quantum computing applications?

That's a hard call to make. In the next 5-10 years, applications li machine learning may indirectly affect consumers. For example optimized machine learning might improve anything from artific database searches, but consumers will just see great products those advances without interacting directly with a quantum cor thought of a direct consumer-quantum interaction sounds supe personally. There are several challenges to overcome first, like c decoherence, error correction, and a general lack of software ap

5. How does quantum computing intersect with oth technologies and scientific fields such as big data, and medicine?

I've actually written about this before on my quantum computir on which website you trust and your faith in statistics, about 90 the world was created in the last 2 years. That's insane. We're g quintillion bytes of data each day. At that pace, it's no wonder w much progress toward getting more out of this data deluge. We then we know what to do with, and almost no way to process it rate of data creation is growing almost exponentially. For exam a little more than 3.5 million text messages per minute. In 2017 million texts per minute. 15 million!

I believe quantum computing will give us the ability to actually s all of this data. Without its potential efficiencies, how can we po these enormous data sets within a practical amount of time? In cities and the internet of things are just useful products of our a strategically gather, digest, and apply lessons learned from the gathering. Today medical researchers pay thousands of dollars computers to execute complex analyses on large data sets. The limited by the number of variables they can account for when d

drugs or targeting treatments. Quantum computing has the pot
that.

6. What role might standards and IEEE have in bring future of quantum computing?

I believe quantum computing is poised for significant growth ar
advancement, but it is currently hindered by the lack of a comm
So I'm thrilled to be leading the effort to address that problem c
approved IEEE P7130™ – Standard for Quantum Computing De
chair of the IEEE Quantum Computing Working Group.

By standardizing terminology, we will reduce confusion for all s
help establish the foundation for the quantum computing indus
scientists, entrepreneurs, investors, and potential customers wi
language to collaborate and innovate. We're inching closer to th
industry right now.

7. Your keynote for SXSW is an opportunity to cove computing for the masses. What are you hoping th learns?

I've really been working hard on this material. I have two main g
to the audience what quantum computing is, its history, where
evolution, and why it's important to them. Two, engage them dir
providing educational resources, open source tools, etc. that th
same day to experiment and play with this amazing technology
leave with a solid understanding of quantum computing and th
some hands-on experience.

8. As a veteran SXSW attendee, what are you most to this year?

I had an amazing SXSW 2016. I took SXSW 2017 off to support

launched his first startup, Chilligence. 2018 is personally excitin
first year I've actually made the schedule.

I'm stoked to be a part of the IEEE Tech for Humanity series on
hear what Dean Kamen is going to share on biofabrication and
medicine, along with Poppy Crum on Hearables and Hugh Herr'
panel. IEEE also throws a really party fun at the Driskill that I wil
year.

I'm also super excited to see Sadiq Khan, Christiane Amanpour,
Jocelyn Conn, Akash Goyal, Ramin Hedayati, Hasan Minhaj, and
everything in the Social Impact track, and obviously I want to be
Mark Cuban announces his candidacy for President of the Unite

Whurley has been announced as a keynote speaker at the annu
Conference, March 9-18, 2018 in Austin. The session, *The Endle*
Quantum Computing will be included as a part of the IEEE Tech
Series at SXSW.

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