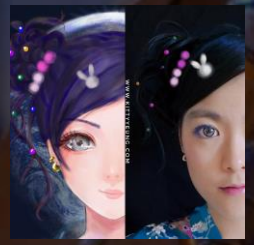
Introduction to Quantum Computing



Kitty Yeung, Ph.D. in Applied Physics

Creative Technologist + Sr. PM
Microsoft

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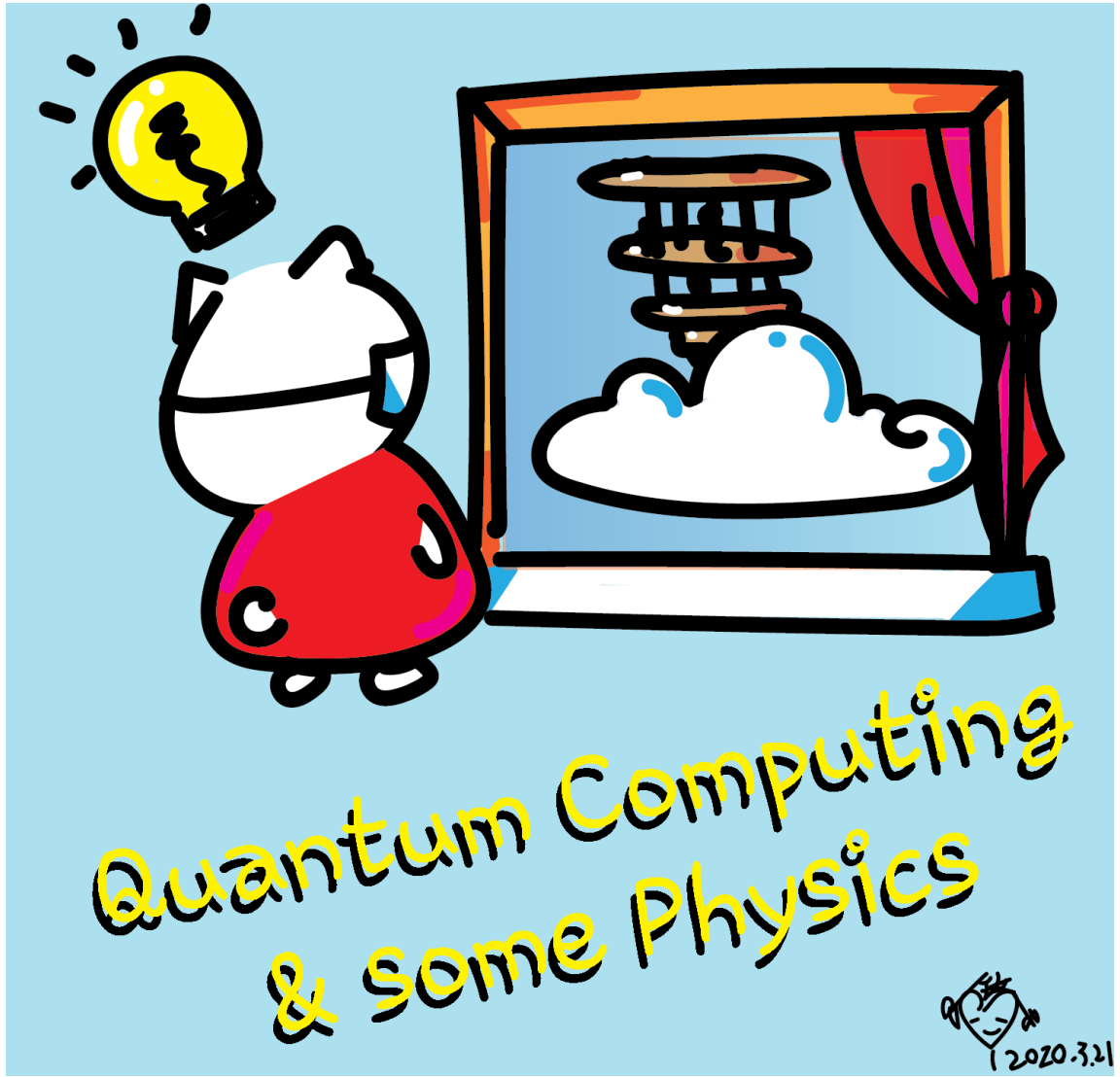
September 13, 2020
Hackaday, session 21
Guest lecture 1

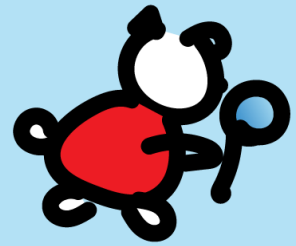
Class structure

- Comics on Hackaday – Quantum Computing through Comics every Sun
- 30 mins – 1 hour every Sun, one concept (theory, hardware, programming), Q&A
- Contribute to Q# documentation http://docs.microsoft.com/quantum
- Coding through Quantum Katas https://github.com/Microsoft/QuantumKatas/
- Discuss in Hackaday project comments throughout the week
- Take notes



THE SUNDAY SPECIALS

September 13
Prof. Terrill Frantz
Quantum Cryptography



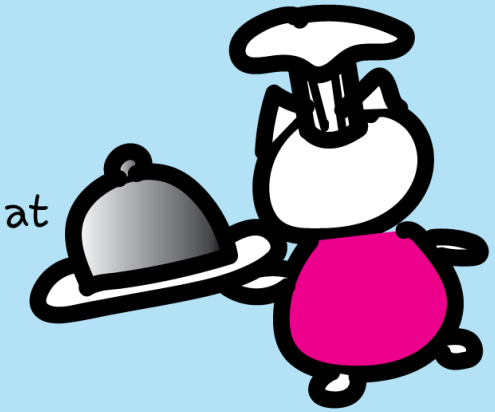
September 20
Prof. Chris Ferrie
Quantum Tomography

September 27
Rolf Huisman
Introducing the open source
Q# Community project qTRIL

October 11
Dr. Maria Schuld
Quantum Machine Learning

October 18
Dr. Michael Beverland
Quantum Error Correction

October 3
Kitty speaking at
Zen4Makers



Quantum Cryptography

- Terrill Frantz is a professor at Harrisburg University of Science and Technology in the USA, where he teaches pre-college, undergraduate, graduate and PhD courses in quantum computing, among other subjects. He recently pivoted into quantum computing after working with classical computing software for over 46 years! Terrill runs https://www.meetup.com/Philadelphia-Harrisburg-Quantum-Computing-Meetup-Group/ and manages http://live.quantumapalooza.com/
- Building on Kitty's two sessions on RSA encryption and Shor's Algorithm, in this session, we will talk briefly about the overall state of cryptography as it relates to quantum and quickly introduce some non-quantum techniques being studied to to take digital security into a post-quantum setting. We will also cover a quantum key distribution (QKD) technique known as BB84, which relies on the "magic" of quantum physics to allow Alice to exchange private keys with Bob with the added benefit of knowing if Eve has intercepted their exchange -- a feature not possible in classical encryption.

Prof. Terrill Frantz

ASIN : B08HGLPZXP

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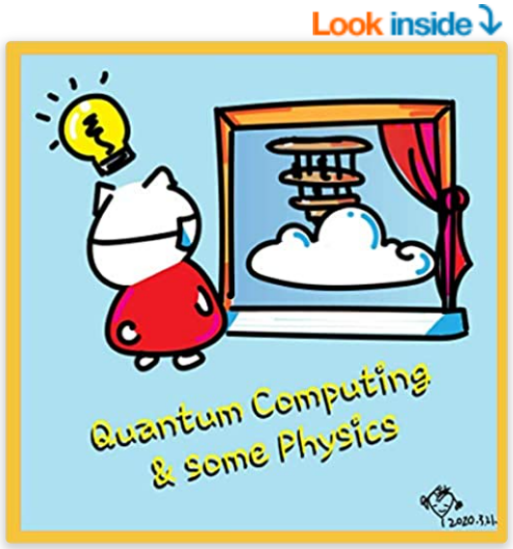

Quantum Computing & Some Physics: The Quantum Computing Comics Notebook

Paperback – September 3, 2020

by Dr. Kitty Yeung (Author)

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Learn about quantum computing through an intuitive series of comics. It is both a book and a notebook, in which readers can note down their thoughts on the back of the comics. The book provides a high-level guide to the basic concepts of quantum computing, linear algebra, and quantum algorithms. Commonly used quantum hardware architectures are also described in the comics. Learners at any age with any background can get something out of this comics. The

Questions

- Post in chat or on Hackaday project https://hackaday.io/project/168554-quantum-computing-through-comics
- FAQ: Past Recordings on Hackaday project or my YouTube https://www.youtube.com/c/DrKittyYeung

Guest lectures

- Sept 20, **Prof. Chris Ferrie**, University of Technology Sydney, **Quantum Tomography** – time-change 2pm PST

- Sept 27, **Rolf Huisman**, Q# Community, **Introducing the open source Q# Community project qTRIL** – normal time 11:30am PST