Lightning
Introductions

Next Steps in Quantum Computing:
Computer Science’s Role
May 22-23, 2018
Matthew Amy/University of Waterloo

I hope to bring some insight on building fully-automated tools for optimizing and verifying quantum circuits.

Primer is a favourite of mine. The time travel mechanics were inspired by Feynman diagrams, so there’s a connection.
Sometimes you trap the ion
and sometimes the ion traps you
Greg Byrd/North Carolina State

IBM Network Q Hub,
Interest in memory hierarchy, error correction

Fargo: very, very cold!
A perspective on large-scale classical simulation and some experiments on current noisy quantum hardware.

ALIEN
Ash: I can't lie to you about your chances, but... you have my sympathies.
What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
Andrew Childs/University of Maryland

What do you hope to bring to the workshop? Discussion of quantum algorithms and their implementation in realistic devices

Favorite quantum movie? The Matrix
Fred Chong/University of Chicago

Discussion of software-hardware co-design to more efficiently map algorithms to devices

The Princess Bride: “My name is Inigo Montoya, you killed my cat. Prepare to die!”
Almadena Chtchelkanova/NSF

What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
What do you hope to bring to the workshop? A broad perspective on quantum computing from algorithms down to device physics.

What’s your favorite movie and how is it related to quantum computing? Deadpool (it’s the only recent one I have seen and remember that wasn’t a kid’s movie). Not really related to quantum, except perhaps Ajax used a QC to determine how to modify DNA.
What we did/said Re: QC in the IEEE Rebooting Computing Initiative and International Roadmap for Devices and Systems [née “ITRS”]

Raiders of the Lost Ark: “I don’t know. I’m making this up as I go.”
Discussion of quantum technologies at the device level, materials and integration challenges

Does The Wire count as a movie?
Learn more about how quantum computing will impact the future of computing.

The Dark Knight - chaos?
A hope that we can get past the “buzz-word-iness” of quantum, especially in DC

The Natural: nothing at all to do with quantum...
Monisha Ghosh/NSF

What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
I consider myself lucky to have entered the field more than 20 years ago, working on QECC and search algorithms from an algebra/discrete math perspective. I hope for more applications with substantial quantum speed-up.

“Once Upon a Time in America” - it took a bit longer to realize it, but it was worth all the effort (in my opinion)
A cross-disciplinary background (PChem; IT policy) and a desire to frame new questions.
What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
What do you hope to bring to the workshop? Ideas for hybrid classical-quantum algorithms and architectural improvements.

What’s your favorite movie and how is it related to quantum computing?
Dr. Strangelove.
I really hope there is no relation, although some say we must not allow a $T_2$ gap.
A hope to gain understanding what a research agenda in quantum looks like (and how to convey that to policymakers)

*Hitchhiker’s Guide to the Galaxy*. Quantum sometimes sounds a lot like the Infinite Improbability Drive.
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**What do you hope to bring to the workshop?**
Enthusiasm for quantum computing tempered by reality.

**Favorite Movie: Marx Brothers “A Night at the Opera”**

| Fiorello: Hey, wait, wait. What does this say here, this thing here? |
| Driftwood: Oh, that? Oh, that’s the usual clause that’s in every contract. That just says, if any of the parties participating in this contract are shown not to be in their right mind, the entire agreement is automatically nullified. |
| Fiorello: Well, I don't know... |
| Driftwood: It’s all right. That’s, that’s in every contract. That’s, that’s what they call a sanity clause. |
| Fiorello: Ha-ha-ha-ha-ha! You can’t fool me. There ain’t no Sanity Clause! |
What do you hope to bring to the workshop? Questions. And a software stack. But mostly questions.

What’s your favorite movie and how is it related to quantum computing? Gattaca. No particular relation - I just like the spirit.
I bring concerns re QC hype (no, not for your laptop). I want to understand best-case scenarios & any connections to ML.

2001: A Space Odyssey [1968 & now] where QC may be need to explain it.
Superconducting quantum hardware and analog quantum simulation

Amadeus. Your work is ingenious. It's quality work. And there are simply too many notes dimensions in your Hilbert space, that's all. Just cut a few and it will be perfect.
Discussion around opportunities for public-private partnerships in quantum.

Not sure it is an all time favorite, but Forrest Gump comes to mind…

[Quantum] is like a box of chocolates, never know what you’re gonna get???
Travis Humble, Oak Ridge National Laboratory

What do you hope to bring to the workshop?
*Technical vision to advance scientific computing and energy security using quantum computers*

What’s your favorite movie and how is it related to quantum computing (if at all)?
*Casablanca*

“Louie, I think this is the beginning of a beautiful friendship.”
Some perspectives on making quantum computers accessible to researchers and the public through open-source software.

Pulp Fiction: It’s actually the opposite of Quantum Computing because it’s nonlinear.
Sonika Johri/Intel

Experience designing algorithms for and using near-term quantum computers

Favorite Movie: Blade Runner
(The replicants have short T1 times)
Roy Batty: I've seen things you people wouldn't believe. Attack ships on fire off the shoulder of Orion. I watched C-beams glitter in the dark near the Tannhäuser Gate. All those moments will be lost in time, like tears in rain…
A comprehensive perspective of quantum computing architecture, hardware realization and algorithms

Dr Zhivago: Many scenes were cryogenic in feel and in backdrop!!
Jungsang Kim/Duke University & IonQ

Systems and engineering perspectives to designing, constructing and using useful quantum computers for practical applications

Star Wars:
“It’s a(n ion) TRAP!!”
“May the (spin-dependent) force be with you.”
Vadym Kliuchnikov/Microsoft Research

Industry and research experience in quantum circuit synthesis, optimization and layout

Stalker
John Kubiatowicz/UC Berkeley

What do you hope to bring to the workshop?
Long-term interest in quantum computer architecture and quantum CAD design;
Area Delay to Correct Result (ADCR)

Favorite Movie: The Adventures of Backaroo Banzai: “Wherever you go, there you are.”
QC: The Overthruster takes you into the 8th dim
Expertise and enthusiasm about quantum information, programming languages, and mathematical logic.

*The Third Man* (since it's about crime and murder, I hope there's no relation to quantum information)
Yi-Kai Liu/NIST

What do you hope to bring to the workshop?
*Experience with many different layers of the quantum computing “stack,” from quantum algorithms to device characterization*

What’s your favorite movie and how is it related to quantum computing?
*“Midnight Run” -- it reminds me of my colleagues :)*
Igor Markov/University of Michigan

Expertise in
1. Synthesis, optimization verification and simulation of QCs
2. Classical Electronic Design Automation, including design flows and optimizations for logic and physical synthesis
3. Combinatorial and numerical optimization

Movies & quotes -
Inception
- Well, dreams, they feel real while we're in them, right?
- You musn't be afraid to dream a little bigger ...
- We need a big kick!

The Matrix - a movie about the Church-Turing hypothesis
- There is a difference between knowing the path and living the path
Margaret Martonosi/Princeton University

Toolchain and architecture experience
+ Ideas on how CS disciplinary expertise is needed as QC develops

Favorite Movie? Invictus
Relation to QC? Almost none! Maybe some of the lines from the poem? “Bludgeonings of chance”...
Dmitri Maslov/NSF

What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
What do you hope to bring to the workshop?

I hope to get ideas for algorithms that can be run on small quantum computers.

Favorite movie: Back to the Future. Are flux capacitors useful for quantum computing?
What do you hope to bring to the workshop?
Experience developing multidisciplinary R&D programs - Leading a research team of quantum algorithm researchers & architects
Favorite movie? Hugo
QC Related? “My friends, I address you all as you truly are; wizards, mermaids, travelers, adventurers, magicians… Come and dream with me!”
Mimi McClure/NSF

I bring my best listening ears and open mindedness to the workshop. I’m very interested in what the participants have to say.

I’m a total Harry Potter fan but he doesn’t need quantum, he’s got magic. Hmmm, there may be some commonality.
What do you hope to bring to the workshop? Experience with semantic models for classical and quantum programming languages.

What’s your favorite movie and how is it related to quantum computing (if at all)? *Midnight in Paris* - the time travel was obviously a quantum effect!
What do you hope to bring to the workshop? Fresh eyes to look for new opportunities in quantum resource savings!

What’s your favorite movie and how is it related to quantum computing (if at all)?

007 - A quality watch and ... Q.
What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
Irene Qualters/NSF

What do you hope to bring to the workshop?

What’s your favorite movie and how is it related to quantum computing (if at all)?
Moin Qureshi/Georgia Tech

What do you hope to bring to the workshop?
An architectural perspective on Quantum Computing + interest in system level metrics for reliability and performance of NISQ computers

Fav Move? GATTACA
Related? (perhaps to Errors in Quantum)
“They have got you looking for any flaws [Errors], that after a while that’s all you see”
Let’s talk about formally verified quantum programming!

I really enjoyed X-Men: First Class. Little known fact: Cerebro is a quantum computer.
Passionate about quantum algorithms, in particular for problems where there is a *dramatic* speedup.

I work on quantum programming languages and develop libraries for Microsoft’s Q#.

My favorite movie by far is The Big Lebowski. Because it really ties the (Hilbert) space together...
I hope to bring to the workshop some knowledge of quantum programming languages and quantum circuits.

My favourite movie is “In the mood for love”. I don’t think it has anything to do with quantum computing.
I hope to bring interest in quantum information flow and quantum logic as foundations for programming and reasoning.

I don’t know about a “favorite” movie but how about “The Truman Show” as something lightheartedly relevant to this workshop.
Hopefully I can bring some ideas about type-safe quantum programming languages and quantum circuits.

My favorite movie is “Lord of the Rings”. It is related to quantum computing because matrices form a ring.
I hope to better understand how we can create a quantum-smart workforce across disciplines and expand American leadership in QIS.

Favorite movie: If stuck in on a desert island, “The Martian”. If stuck in a time loop, “Arrival”. If just for fun, any Branagh Shakespeare.
I hope to bring discussion on resource efficient design of quantum arithmetic circuits for scientific applications.

Favorite Movie: Moneyball (a good example of statistics)
New platforms for QC, modular/hybrid systems with photons

QM Movie: I'm holding out for a movie that involves quantum mechanics the way *Interstellar* involved general relativity. Who will be our Kip Thorne?
I hope to learn more about quantum computing while encouraging everyone to think of next steps (and perhaps get some good movie recommendations as well).
I hope to bring ideas from quantum algorithms (optimization & machine learning), complexity (short-depth circuits), and programming languages to the discussion.

While I was thinking about Forrest Gump and the chocolate-box metaphor, I realize it has already been taken by someone else :(
Jon Yard/University of Waterloo/Perimeter Institute

Hopefully I bring ideas and expertise in quantum information theory, number theory and algorithms.

Favorite movie:

Obvious relevance to quantum computing
William Zeng/Rigetti Computing

What do you hope to bring to the workshop?

Experience building and designing full-stack quantum/classical hybrid computers and questions about how we can all make them useful as soon as possible.

What's your favorite movie and how is it related to quantum computing?

Paprika: dreams and multiverses are somehow quantum right?