

Diversifying Talent in Quantum Computing

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Background: What is DTQC?

- Diversifying Talent in Quantum Computing
- Partnership between:
 - UBC Geering Up
 - Stewart Blusson Quantum Matter Institute
 - Canadian Digital Tech Supercluster
 - D Wave
 - Microsoft
- 3-year capacity building program

PROJECT PARTNERS



Goals of the Project

- Build a diverse talent base for the field of quantum computing
- Reach 1000 students and educators with content
- Early education and focus on underrepresented communities
 - Women
 - Indigenous youth

Why quantum computing?

Emerging field with huge potential for growth

Have the opportunity to influence composition of talent pool

Lower barrier to entry/demystify topic

BC is a hot spot of this emerging industry

Overview of Project Components

- Camps
- Workshops
- Local Events
- Indigenous Outreach
- Professional Development
- In-school Courses
- Podcast
- Quantum Ambassador Program
- Public Outreach Talks
- Online Resources

Three broad
categories

Content

Teaching

Community

CONTENT

Summer Camps

Ideal for project work

24 camps are using
quantum content
this summer!

7 online, 17 in person



Workshops

In-school delivery
24 booked this year
Short-form content



Local Events

- More focused on design
- Longer form content



TEACHING

Professional Development

- Creating education support materials (games, video games, app)
- Launching online course for teachers on quantum computers (August 2022)
 - 6-10 hour long, self-directed
 - Focuses on basic concepts and teachable activities for classrooms
- Take-home activity lessons at Professional Development sessions

Masterclass to Collaboration: University of Ottawa

- A 12-week course (February to May 2022)
- introducing grade 9-12 students to quantum computing
- Originally ran as an online Masterclass
- In partnership with the University of Ottawa, the content became an accredited high school course
- Content being adapted to BC curriculum!

COMMUNITY



Quantum Bits: The Podcast

4 episodes out!

Expert guests

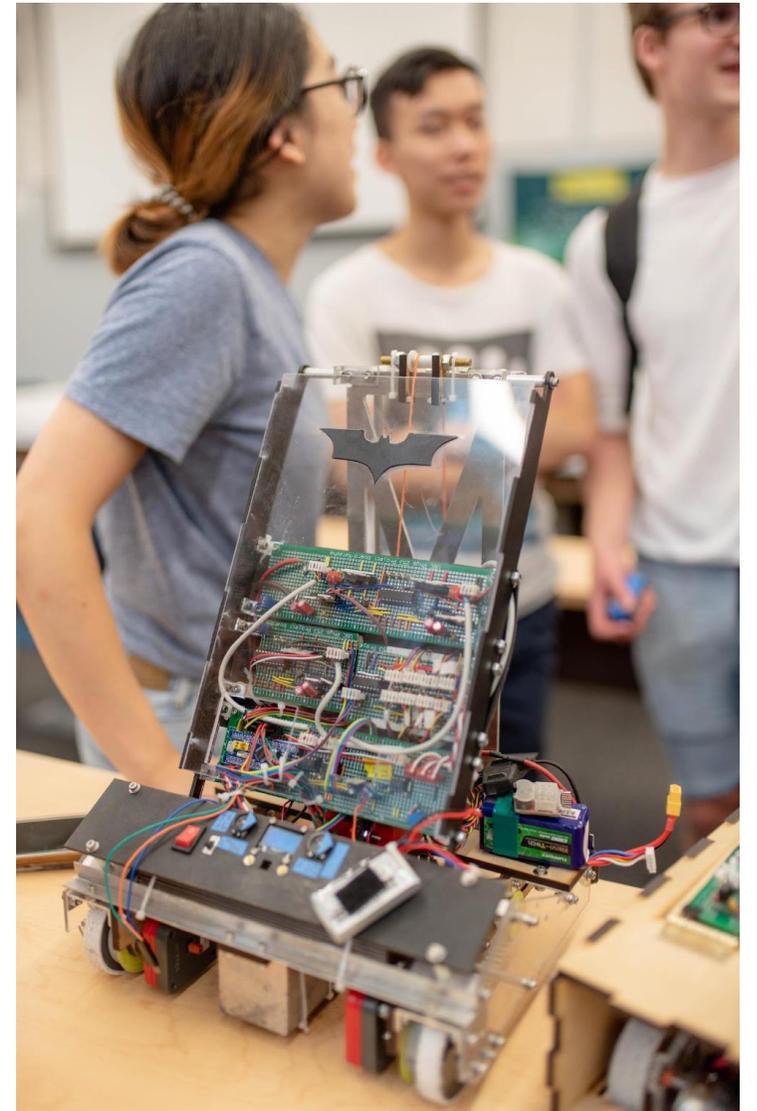
36% female and non-binary
listenership

Season 2 being planned and edited

Quantum Ambassador Program

- High school students particularly interested in quantum computing
- Given opportunity to connect with industry, academics in the field
- Volunteer or teach at our quantum computing camps
- Aims to grow quantum peer community, give students additional resources

What have we
achieved?



Key Metrics

- Over 1350 students and educators reached!
 - over 525 girls
- Outreach:
 - Scheduled for 13 Indigenous communities by end of year
 - 1 Black youth community
- Over 85 educators reached across North America
- First accredited high school course in Quantum Computing in Canada

A close-up photograph of several fresh spinach leaves, each covered with numerous small, glistening water droplets. The leaves are a vibrant green color and are arranged in a slightly overlapping manner. The background is dark, making the green leaves and white text stand out. On the left side, there is a vertical teal-colored bar, and on the right side, there is a vertical grey bar.

What works best; The spinach Smoothie

What's the
"spinach
smoothie?"



How to make learning FUN; Teaching quantum gates kids

- We want to talk about quantum gates: but how? They're just kids!
- Step 1: Start with what they know!
 - How do we use words like AND, OR, and NOT in speech?
- Step 2: Draw a parallel
 - Computers use those words too!

How to make learning FUN

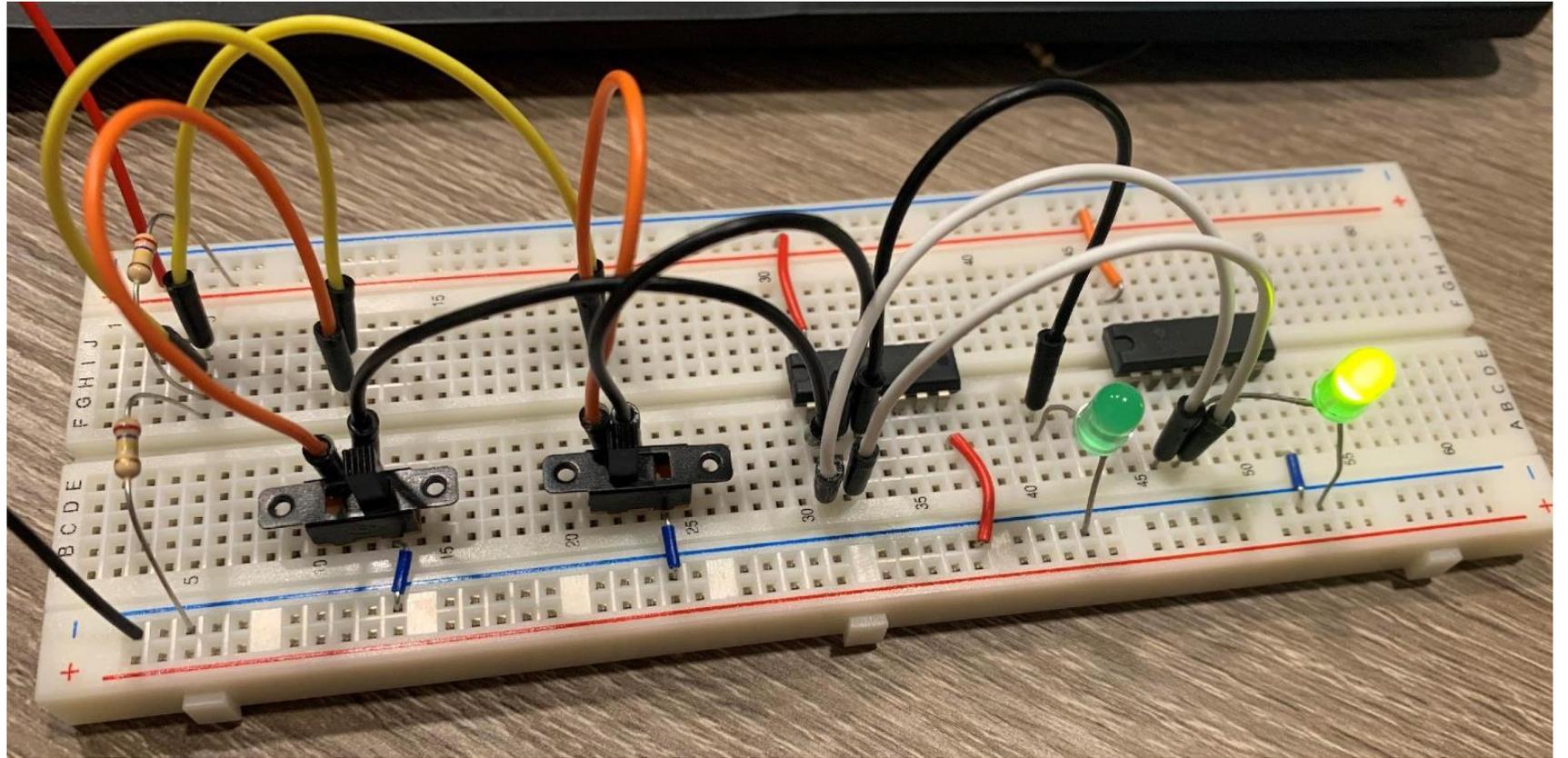
- Step 3: make it interactive
 - This is where I love Turing Tumbles or breadboarding
- Step 4: Sneak in the vegetables
 - Get the students to write down different outcomes
 - This is a truth table in disguise!



Bit 1 Direction	Bit 2 Direction	Colour of caught marble
Left	Left	Red
Right	Left	Red
Left	Right	Red
Right	Right	Blue

Bit 1	Bit 2	Output
0	0	0
1	0	0
0	1	0
1	1	1

For older students, we use breadboards!



This is a half adder circuit. We let them play with the switches and see how the LEDs respond.

How to make learning FUN

- Last step: Take the quantum leap
 - Now that they are comfortable with the ideas, make it quantum
 - Use drag-and-drop circuits (like IBM)

How to make learning FUN

- Bonus step: Gamify
 - Have them challenge the quantum circuit with their classical circuit!

My favorite activities for teaching quantum!

Quantum soap bubbles

Making apps

Drag and drop coding

Video games

Turing Tumbles (analog, marble-powered computers)

Building circuits

Playing games on the Quantum Hub



Opportunities for Engagement and Collaboration

Curriculum for programs

- workshops, camps, events

Collaboration on future projects

- Design activities together

Support our students at your schools

- Support high school and undergrad students to continue in the field!

Thank you!

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