

Quantum City

Addressing quantum industry's needs with new talent
development programs

Carlo Maria Scandolo

Department of Mathematics & Statistics, University of Calgary

Institute for Quantum Science and Technology, University of Calgary

CAP Congress 2023





- Partnership of 3 actors:



- Partnership of 3 actors:
 - 1 Government of Alberta (\$23M),



- Partnership of 3 actors:
 - ① Government of Alberta (\$23M),
 - ② University of Calgary;



- Partnership of 3 actors:
 - 1 Government of Alberta (\$23M),
 - 2 University of Calgary;
 - 3 Mphasis (private IT company).



- Partnership of 3 actors:
 - 1 Government of Alberta (\$23M),
 - 2 University of Calgary;
 - 3 Mphasis (private IT company).
- **Goals:**



- Partnership of 3 actors:
 - 1 Government of Alberta (\$23M),
 - 2 University of Calgary;
 - 3 Mphasis (private IT company).
- **Goals:**
 - 1 fostering research breakthroughs in quantum innovations;



- Partnership of 3 actors:
 - 1 Government of Alberta (\$23M),
 - 2 University of Calgary;
 - 3 Mphasis (private IT company).
- **Goals:**
 - 1 fostering research breakthroughs in quantum innovations;
 - 2 connecting quantum solutions and industry.

Canada's National Quantum Strategy

Based on 3 pillars:

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);
- 3 commercialization of quantum technologies.

Quantum City mission

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);
- 3 commercialization of quantum technologies.

Three priorities of Quantum City

Connector of everything quantum with Alberta economy:

Quantum City mission

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);
- 3 commercialization of quantum technologies.

Three priorities of Quantum City

Connector of everything quantum with Alberta economy:

- 1 recruiting talent (students, professors);

Quantum City mission

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);
- 3 commercialization of quantum technologies.

Three priorities of Quantum City

Connector of everything quantum with Alberta economy:

- 1 recruiting talent (students, professors);
- 2 building infrastructure;

Quantum City mission

Canada's National Quantum Strategy

Based on 3 pillars:

- 1 research;
- 2 talent development (new educational programs);
- 3 commercialization of quantum technologies.

Three priorities of Quantum City

Connector of everything quantum with Alberta economy:

- 1 recruiting talent (students, professors);
- 2 building infrastructure;
- 3 providing pathways to commercialization.

Quantum computing professional master

- Launched by the University of Calgary, with start in **January 2024**.

Quantum computing professional master

- Launched by the University of Calgary, with start in **January 2024**.
- The focus is **professional**, *not* academic. . .

Quantum computing professional master

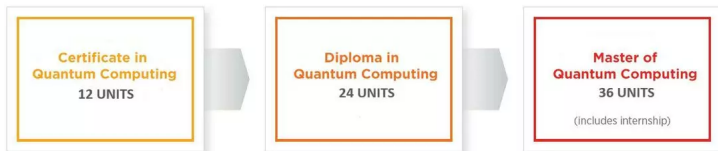
- Launched by the University of Calgary, with start in **January 2024**.
- The focus is **professional**, *not* academic. . .
- i.e. on **practical** applications in quantum and industry.

Quantum computing professional master

- Launched by the University of Calgary, with start in **January 2024**.
- The focus is **professional**, *not* academic. . .
- i.e. on **practical** applications in quantum and industry.
- **12-month** program, with 8 months in class and 4 in an **internship**.

Quantum computing professional master

- Launched by the University of Calgary, with start in **January 2024**.
- The focus is **professional**, *not* academic. . .
- i.e. on **practical** applications in quantum and industry.
- **12-month** program, with 8 months in class and 4 in an **internship**.
- It's a laddered program:



Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing...

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

- bachelor's of science, engineering, or equivalent;

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

- bachelor's of science, engineering, or equivalent;
- completion of a linear algebra, computer programming, or equivalent course;

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

- bachelor's of science, engineering, or equivalent;
- completion of a linear algebra, computer programming, or equivalent course;
- minimum 3.0 GPA (out of 4.0).

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

- bachelor's of science, engineering, or equivalent;
- completion of a linear algebra, computer programming, or equivalent course;
- minimum 3.0 GPA (out of 4.0).
- **No previous quantum knowledge required!**

Target and admission

- Ideal for **new graduates**, wishing to transition to quantum computing. . .
- or **mid-career** professionals.

Admission requirements

- bachelor's of science, engineering, or equivalent;
- completion of a linear algebra, computer programming, or equivalent course;
- minimum 3.0 GPA (out of 4.0).
- **No previous quantum knowledge required!**

Application deadline **1 September 2023** (international) and **3 October 2023** (domestic).

Certificate

- 4 months.

Certificate

- 4 months.
- 4 courses:

Certificate

- 4 months.
- 4 courses:
 - 1 pure quantum information & quantum algorithms;

Certificate

- 4 months.
- 4 courses:
 - ① pure quantum information & quantum algorithms;
 - ② quantum software;

Certificate

- 4 months.
- 4 courses:
 - ① pure quantum information & quantum algorithms;
 - ② quantum software;
 - ③ applications of quantum computing (simulation, machine learning, etc.);

- 4 months.
- 4 courses:
 - 1 pure quantum information & quantum algorithms;
 - 2 quantum software;
 - 3 applications of quantum computing (simulation, machine learning, etc.);
 - 4 business of quantum computing (quantum computing & industry).

- 4 months, after the Certificate.

- 4 months, after the Certificate.
- 4 courses:

- 4 months, after the Certificate.
- 4 courses:
 - 1 industrial applications of quantum software;

- 4 months, after the Certificate.
- 4 courses:
 - 1 industrial applications of quantum software;
 - 2 quantum hardware & how to build a quantum computer;

- 4 months, after the Certificate.
- 4 courses:
 - 1 industrial applications of quantum software;
 - 2 quantum hardware & how to build a quantum computer;
 - 3 noisy quantum information, error correction & fault tolerance;

- 4 months, after the Certificate.
- 4 courses:
 - 1 industrial applications of quantum software;
 - 2 quantum hardware & how to build a quantum computer;
 - 3 noisy quantum information, error correction & fault tolerance;
 - 4 quantum entrepreneurship & startups.

- 4 months after the Diploma.

- 4 months after the Diploma.
- 1 module on current issues in quantum computing;

- 4 months after the Diploma.
- 1 module on current issues in quantum computing;
- 1 internship, either **industrial** or **academic**.

- 4 months after the Diploma.
- 1 module on current issues in quantum computing;
- 1 internship, either **industrial** or **academic**.
- For more information:
<https://science.ucalgary.ca/future-students/professional-programs/quantum-computing>