Title: Quantum Computing Patents â€“ Lunch and Learn

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Abstract: The session is addressed to educating startups, SMEs, and researchers to acquire fundamental knowledge on IP within the quantum computing domain. This introductory session includes real-world examples to explain the patent process with a view to commercialization of quantum computing projects. Other forms of IP are also covered. The session is facilitated by Benjamin Mak and Marco Clementoni of Ridout & Maybee LLP.

Zoom Link: TBD

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Intellectual Property for Quantum Technology Companies

What is intellectual property (IP)?

- IP refers to a class of intangible assets created by the human intellect.

- IP *rights* are legal rights that provide a measure of exclusivity to the creators of IP. Typically national in scope.

Types of IP

Patents inventive systems, devices, methods, etc. and the concepts behind them (e.g., Amazon's one-click purchase system)

Trademarks words or combination of words, sounds, logos, color, etc. used to distinguish goods or services (e.g., Toyota)

Types of IP – cont'd

Industrial designs	non-functional form and/or ornamentation (e.g., shape of a Coca Cola bottle)
Copyrights	original literary, artistic, dramatic, or musical works
Trade secrets	confidential knowledge and information

Patents

- limited-time monopoly to exclude others from making, using, selling, and importing the "invention"
- must be new, non-obvious, and useful invention
- national or regional - must be applied for in countries in which protection is sought
- can be expensive to file in many jurisdictions
- labor-intensive - both from the client's and from the patent agent's perspective, as knowledge transfer is hard

Parts of a patent application

- background : discussion of current state of the art
- disclosure : description of your solution(s)
- claims : what novel and inventive features you want as a monopoly
- drawings : illustrate how the invention works
- abstract : short synopsis of your invention
- forms : provides inventor and applicant details

Provisional patent applications

- serve as a priority basis for later-filed "full" applications
- can be just a disclosure (and drawings, if helpful)
- not examined by itself
- doesn't issue to a patent
- file when an improvement is developed sufficiently
- can update with additional improvements or modifications
- should be prepared as fully as possible to avoid support issues
- shoestring provisional patent applications are risky

Life of a typical U.S. patent application

- optional patentability search
- preparation of patent application
- filing
- publication after 18 months
- examination starts 9 to 30 months after filing (automatically happens in the U.S.)
- examiner raises issues with application in Office Actions
- applicant addresses issues in responses to Office Actions with help of patent agent
- receive a Notice of Allowance once issues addressed
- issues to patent
- enforceable for 20 years from the filing date

Why patents?

- protects innovations resulting from investments in research and development
- deter other companies from using your inventions
- marketing tools
- indicate that your company is sophisticated
- assure investors that their investments will be protected
- licensing revenue
- cross-licensing tools
- increase company value

When to file patent applications

- important to file a provisional or full application in one country as soon as possible
- depending on finances and maturity of technology
- "run to the patent office"
- some countries allow a one-year disclosure grace period

Quantum technology innovations

Quantum computers

- combination of a classical computer system and quantum hardware

Quantum hardware

- types of qubits
- "gates"
- sensors
- qubit lifetime (i.e., coherence)
- error correction (to address decoherence)
- scaling

Classical computer system

- programming platform
- algorithms for problem classes

Quantum tech. innovations – cont'd

Quantum communications

- reliability in fiber communications an issue
- use of entanglement effects and quantum memories to compensate for reliability issues
- improvements in transmission distances

What is patentable?

- all of these

Current opportunities

- examiners are generally lacking expertise in these fields
- examiners can simply allow claims out of a lack of understanding or patience
  - failure to understand prior art and insufficient time to perform a search of the prior art
  - results in claims that may be very broad
  - can be threatening to competitors
  - possibly subject to invalidation in the courts

Patent strategies

- know your space and competitors - this helps you appreciate the differences in your solution and know when to think about patenting
- budget for patent application costs, both money and time
- look into grant money available for intellectual property spending

IP ownership

- creator is, in the absence of obligations, the owner
- employee and contractor agreements can enforce company ownership
- employees : during business hours, with company resources, and within the role of the employee
- university innovation policies

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Thank You!

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Who we are

Ridout & Maybee LLP

- law firm with practice restricted to intellectual property
- founded in 1893
- offices in Toronto, Ottawa, and Burlington
- 30+ lawyers and agents with backgrounds in engineering and science
- international network of associates