

## **\*UPDATE: OCE ENCQOR 5G Academic Technology Development Challenge - Device Coexistence in the 6GHz Band**

### **Sponsor**

Ontario Centres of Excellence (OCE)

### **Program**

ENCQOR (Evolution of Networked Services through a Corridor in Quebec and Ontario for Research and Innovation) is a collaboration between the governments of Ontario, Quebec and Canada and is powered by five global digital technology [Anchor Firms](#) [1]: Ericsson, Ciena Canada Inc., Thales Canada Inc., IBM Canada and CGI. There are [five streams](#) [2] within this program. This announcement is for the Academic Technology Development stream.

The ENCQOR 5G Academic Technology Development Program partners researchers at Ontario-based post-secondary institutions with ENCQOR 5G Anchor Firms on 5G technology development projects. Areas of research interest are defined by Challenge Statements submitted to OCE by the ENCQOR 5G Anchor Firms and posted to the OCE website on a rolling basis.

This Research Alert is for **Device Coexistence in the 6GHZ Band** and the Project Partner is **Ericsson Canada Inc.**

### **For More Information**

ENCQOR 5G Academic Technology Development [Program](#) [3]

Program [Guidelines](#) [4]

Ericsson Canada Inc. [Challenge Statement](#) [5]

### **Description**

**Challenge Statement:** With increased traffic demand on cellular networks additional spectrum is needed. Ericsson is interested in exploring the potential of utilizing the 6GHz licensed exempt spectrum with LTE and 5G technology. Ericsson is interested in analyzing the two most popular methods for coexistence of radio devices in licensed exempt spectrum: energy detection and preamble signal detection.

### **Project Details:**

- Because of the ever-growing traffic demand in cellular networks additional radio spectrum for mobile communication is needed. With the amount of licensed radio spectrum being limited, 3GPP started investigating the use of license-exempt spectrum with LTE and 5G technology.
- Termed 6 GHz band, several countries are studying if the 5.925 GHz to 7.125 GHz band could be made available for license-exempt use. Whereas, use of the 2.4 GHz and 5 GHz license-exempt spectrum has been dominated by IEEE 802.11 Wireless LAN (Wi-Fi), the new 6 GHz spectrum is a greenfield band that many dissimilar technologies will occupy as soon as the band becomes accessible.
- When operating in license-exempt spectrum, radio devices need to employ coexistence mechanisms that help to efficiently share the spectrum among their own and dissimilar technologies to reduce the interference that may cause a radio communication signal to fail.
- One such mechanism is Listen-Before-Talk (LBT) that senses the radio channel for other transmissions. If found, a device defers from occupying the radio channel since multiple, simultaneous transmissions cause interference.
- To avoid such interference, it has been proposed that devices could defer from transmitting if the energy that exceeds a certain threshold is detected in the radio channel. (energy detection method for coexistence)
- A different mechanism, the preamble detection method for coexistence, is used in IEEE 802.11. IEEE 802.11 devices which search for the IEEE 802.11 'preamble signal'. When an IEEE 802.11 device detects an IEEE 802.11 preamble signal the device behaves more carefully and act less aggressively. However, the IEEE 802.11 preamble signal can be easily missed as this method of coexistence has not been improved upon in the 20 years since it was developed.
- Various entities have claimed that coexistence between dissimilar technologies would be improved if all technologies operating in the 6 GHz band were forced to implement the IEEE 802.11 preamble signal. However, this idea has been disputed because of limits to the preamble's robustness and detectability. Since today's networks are much more dense and employ many more devices than when this method was developed at the end of the last century, Ericsson is interested in working with an academic partner to determine if the preamble signal method of coexistence meets modern needs.

### **Project Goals/Outcomes:**

The successful academic team is expected to:

- Analyze if the IEEE 802.11 preamble helps to improve coexistence in a modern context. Develop a flexible solution that will generate the IEEE 802.11 preamble under various conditions. E.g., the presence of background noise or previously unused settings.
  - Analyze the behavior of 10-15 commercially available IEEE 802.11 devices and assess their sensitivity to the preamble.
  - Assess how often devices trigger a deferral based on the preamble resp. on exceeding the energy detection threshold.
  - Analyze if the efficiency of IEEE 802.11 networks improves if the preamble is

- omitted resp. if energy detection is performed at thresholds different from today's settings. Through statistical evaluation and big data analysis, correlations shall be revealed
- The project will also analyze preamble vs energy detection behaviour of commercial IEEE 802.11 nodes for;
- Rate-dependent compliance of the selected units to IEEE 802.11 standards and regulatory compliance guidelines
- Investigate concurrent behaviour of multiple devices regarding fair sharing of the spectrum
- Investigate commercial IEEE 802.11 nodes under structured interference
- The project will result in a set of recommendations for future deployments and the settings selection.

## Eligibility

### Applicant

- Principal investigator at an accredited, publicly-funded Ontario university, or applied research officer at an accredited, publicly-funded Ontario college (additional primary researchers must be listed as team members in the application)
- Adjunct professors may be eligible on a case-by-case basis. At a minimum, the adjunct professor must: 1) actively conduct research at an Ontario institution, 2) be allowed by the institution to hold a grant and given an institutional account, and 3) be allowed to supervise students
- The applicant must have an arms-length relationship with the ENCQOR 5G Anchor Firm Partner defined in the ENCQOR 5G Academic Technology Development Challenge Statement for which they are applying
- Applicants must be in good financial and reporting standing with OCE
- Applicants must be willing to co-operate in providing project and outcomes metrics
- Applicants must be willing to execute a non-disclosure agreement (NDA) with the ENCQOR 5G Anchor Firm Partner defined in the ENCQOR 5G Academic Technology Development Challenge Statement for which they are applying
- Applicants must be willing to undergo the procurement process of the ENCQOR 5G Anchor Firm Partner defined in the ENCQOR 5G Academic Technology Development Challenge Statement for which they are applying
- Applicants must be willing to enter into a funding agreement with OCE and Innovation ENCQOR
- Applicants must be willing to enter into a separate agreement with the ENCQOR 5G Anchor Firm Partner defined in the ENCQOR 5G Academic Technology Development Challenge Statement for which they are applying
- Additional Applicant eligibility requirements may vary by Challenge Statement.

### ENCQOR 5G Anchor Firm Partner

- Project Partners must be one of the Ontario ENCQOR 5G [Anchor Firms](#) [1]
- Partners are defined in the posted Challenge Statement

## Project

- Projects must be developed in response to an active [ENCQOR 5G Academic Technology Development Challenge Statement](#) [6]
- Areas of technology interest and expected project outcomes will be defined in the ENCQOR 5G Academic Technology Development Challenge Statement
- Projects must be between 12-24 months in duration. Expected project timeline will be defined in the ENCQOR 5G Academic Technology Development Challenge Statement.
- All ENCQOR 5G Academic Technology Development Challenge Statements and projects developed in response to these Challenge Statements must drive the development, integration, testing or validation of pre-commercial technologies with a link to the Innovation Platform as Service (iPaaS) testbed
- Project activities may vary from R&D to later stage validation- expected technology readiness level of the solution technology may vary by ENCQOR 5G Academic Technology Development Challenge Statement but must be within TRL levels 1-7
- Projects should show a clear fit with the industry priorities outlined in the ENCQOR 5G Academic Technology Development Challenge Statement and show strong potential for commercial impact on the ENCQOR 5G Anchor Firm Partner
- The ENCQOR 5G Anchor Firm Partner must be able to utilize the results of the project for the economic, environmental or social benefit of Ontario. This includes direct economic benefit to the Anchor Firm (e.g., new jobs, increased revenue, increased productivity, cost savings), and/or indirect economic benefit to other members of the value chain, partners, or industry in Ontario (e.g. job creation, capacity building, strategic benefit). Contribution to the training and industry exposure of Highly Qualified Personnel (HQP) at the company is also a desired element.
- Intellectual Property (IP) arising from the project will be managed by the project participants as OCE does not claim or manage IP rights. Successful applicants and the ENCQOR 5G anchor firm(s) must execute OCE's standard funding agreement, including an executed Schedule D, Intellectual Property Term Sheet (for example, in the form of a Collaborative Research Agreement), within 30 days of notification of approval.

## Maximum Project Value

\$150,000 consisting of a maximum of:

- \$136,364 for project costs
- \$13,636 for indirect costs

Matching contributions are preferred, but there is no mandatory matching funding requirement for this program

## Indirect Costs

10% of eligible project costs up to a maximum of \$13,636

## Project Duration

Up to 2 years

## Special Notes

Work would be completed at the University with some travel to Ottawa to work with the Ericsson team at their facility in Kanata.

## Deadlines

**If College-level review is required, your College will communicate its earlier internal deadlines.**

Type	Date	Notes
<b>Internal Deadline</b>	Friday, September 6, 2019 - 4:30pm	<b>*Internal Deadline has been updated.</b>  Please submit your Expression of Interest (EOI), along with a signed <a href="#">OR-5 Form</a> [7] to <a href="mailto:research.services@uoguelph.ca">research.services@uoguelph.ca</a> [8]
<b>External Deadline</b>	Friday, September 13, 2019 - 11:59pm	

## How to Apply

This program has a two-stage [application process](#) [9]:

Step 1: Expression of Interest (EOI)

Step 2: Full Application

For Questions, please contact

For questions about the program, please contact:

Sarah Fairlie

Analyst, Digital Economy Technologies

[sarah.fairlie@oce-ontario.org](mailto:sarah.fairlie@oce-ontario.org) [10]

(416) 861-1092 x1083

**Office of Research**

Angela Vuk, Senior Grants and Contracts Specialist

Research Services Office

519-824-4120 x55026

[avuk@uoguelph.ca](mailto:avuk@uoguelph.ca) [11]

Alert Classifications **Category:**

Funding Opportunities and Sponsor News

**Disciplines:**

Information and Communications Technology

Physical Sciences and Engineering

---

**Source**

**URL:** <https://www.uoguelph.ca/research/alerts/content/update-oce-encqor-5g-academic-technology-development-challenge-device-coexistence-6ghz-band>

**Links**

[1] <https://ontario.encqor.ca/partners/>

[2] <https://ontario.encqor.ca/#>

[3] <https://ontario.encqor.ca/5g-encqor-academic-technology-development-program/>

[4] [https://oce-ontario.org/programs/encqor/5g-\(encqor\)-academic-technology-development-program](https://oce-ontario.org/programs/encqor/5g-(encqor)-academic-technology-development-program)

[5] [https://oce-ontario.org/docs/default-source/default-document-library/ENCQOR/encqor-challenge-statement\\_6ghz\\_band--en-final.pdf?sfvrsn=2](https://oce-ontario.org/docs/default-source/default-document-library/ENCQOR/encqor-challenge-statement_6ghz_band--en-final.pdf?sfvrsn=2)

[6] [https://oce-ontario.org/programs/encqor/5g-\(encqor\)-technology-development-program-challenge-statements](https://oce-ontario.org/programs/encqor/5g-(encqor)-technology-development-program-challenge-statements)

[7] <https://www.uoguelph.ca/research/for-researchers/funding/apply/or-5>

[8] <mailto:research.services@uoguelph.ca>

[9] [https://www.oce-ontario.org/programs/encqor/5g-\(encqor\)-academic-technology-development-program](https://www.oce-ontario.org/programs/encqor/5g-(encqor)-academic-technology-development-program)

[10] <mailto:sarah.fairlie@oce-ontario.org>

[11] <mailto:avuk@uoguelph.ca>