

CIFAR Junior Fellowship – Nanoelectronics Program

The **Junior Fellow Academy** of the **Canadian Institute for Advanced Research** is an elite fellowship program designed to build research and leadership capacity in gifted young scholars at a critical early stage of career development. The Academy provides unique opportunities for personal and professional growth through close collaboration with and mentorship from some of the best researchers in Canada and around the world.

By participating both in an innovative CIFAR research program and the leadership-building Junior Fellow Academy, Junior Fellows learn to embrace CIFAR's core values: to think broadly and imaginatively across disciplines and to collaborate on a deep level with colleagues. These valuable experiences are intended to profoundly impact a Junior Fellow's future career path.

CIFAR's [Nanoelectronics Program](#) is seeking an **outstanding postdoctoral researcher** to fill a Junior Fellowship position beginning in or after September 2012 to work on the theory of quantum optomechanical systems based on superconducting microwave circuits and superconducting qubits. The successful candidate will work with the internationally-leading groups of program members, Prof. **Alexandre Blais** at Université de Sherbrooke (Sherbrooke, Québec), and Prof. **Aashish Clerk** at McGill University (Montréal, Québec) under joint supervision. The Junior Fellow is expected to split his/her appointment between Université de Sherbrooke and McGill University, spending significant time at both institutions. The position thus offers a unique opportunity to be exposed to two different research environments, and to learn a complementary set of skills from two established PIs and their respective research groups. This challenging project offering great potential is further described below.

The **Nanoelectronics Program** makes, measures, controls and predicts the properties of nanoscale systems with the aim of understanding and harnessing the many exciting phenomena emerging at this length scale for the purpose of information processing, storage or transmission. The vision of the program is to control single photons, spins and electrons to lay the scientific foundation for nanoelectronics. The program currently focuses on five interrelated fields: 1. light localization and nanophotonics, 2. quantum cavities and resonators, 3. molecular electronics, 4. spintronics, and 5. bio nano electronics

The Project: This Junior Fellowship focuses on progress in quantum optomechanical systems which in the last few years has led to a situation where researchers are able to achieve truly quantum regimes of operation, and regimes where strong-coupling effects are important. A full theoretical understanding of these systems in these regimes, as well as their potential utility for quantum information applications, is currently lacking; it is the goal of this project to remedy this situation. The hope is that establishing this theoretical framework will also yield new insights into the general problem of quantum noise in driven non-linear systems, a problem of relevance to a variety of physical systems. The two PIs on the project have a complementary set of expertise that will greatly aid the project: Blais is an expert on circuit QED and quantum optics with superconducting microwave circuits, whereas Clerk has extensive experience in quantum electromechanical and optomechanical systems. The successful candidate will also be free to pursue research in other related areas of quantum condensed matter and quantum optics.

Eligibility: Individuals who have completed their PhD within the past three years, or will complete their doctorate before September 2012, are eligible to apply. The successful candidate will have an outstanding background and track record of success in the theory of quantum optomechanics, superconducting circuits, quantum optics, quantum condensed matter, or other closely related fields. She or he will have demonstrated excellence in interdisciplinary collaborations, a hands-on attitude, excellent communication skills and leadership qualities. The candidate will also be interested in exploring the contributions of research to society in collaboration with their peers from other CIFAR programs.

Duration: The first two years are funded, as below, with Junior Fellows embedded in a CIFAR program. Thereafter, CIFAR will cover the cost for Junior Fellow Alumni to attend Academy meetings for an additional three years.

Value: \$70,000 CDN/year for salary, plus benefit support, if needed
\$5,000 CDN/year for research support

How to Apply: Applications will be submitted through an online application system. Fall application requirements and instructions will be posted at www.cifar.ca/JFA. **The application deadline is January 20, 2012.** Visit the website today for more information about CIFAR and its Junior Fellow Academy.

CIFAR is strongly committed to diversity within its community, and especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, members of sexual minority groups and others who may contribute to further diversification of ideas.