The University of Western Ontario
DEPARTMENT OF PHYSICS AND ASTRONOMY

2016 Canadian Association of Physicists (CAP) LECTURE TOUR

Date: **THURSDAY, 24th March 2016**
Time: **3:30 p.m.**
Location: **Physics & Astronomy Room 100**

Dr. Stephanie Simmons

Department of Physics
Simon Fraser University

"The International Race for a Quantum Computer"

ABSTRACT

It can be difficult to discern true breakthroughs in modern quantum computing research. Given the tremendous potential of these future technologies, it is perhaps not surprising that small steps are sometimes heralded as momentous game-changers. Some of this enthusiasm is misplaced — as far as we know so far, quantum computers could only outperform today's "classical" computers at specific tasks. Nevertheless, the tasks they would excel at are of incredible value, and quantum engineering R&D is starting to move beyond academic labs and into industry. In this talk I will outline the quantum-mechanical underpinnings of such impressive computational power, and give an overview and status update of this very rapidly moving field. Within this overview I will describe some of the small but important steps our lab has recently taken using silicon-based CMOS-compatible quantum systems.

Short Bio of the Speaker:

Dr. Stephanie Simmons is an Assistant Professor at Simon Fraser University. She received an undergraduate double degree in Pure Mathematics and Mathematical Physics at the University of Waterloo in 2008. She earned a Ph.D. in Materials Science at Oxford University in 2011 as a Clarendon Scholar, and stayed on at Oxford jointly with a Glasstone Research Fellowship and a Junior Research Fellowship at St. John's College, Oxford. In 2014 she took up a joint position in UNSW's Electrical Engineering department and the Australian Centre of Excellence for Quantum Computation and Communication Technologies in Sydney. She joined Simon Fraser University in the fall of 2015. She has worked on silicon-based spin qubits with the particular aim to develop CMOS-compatible scalable quantum technology solutions. Her work on silicon qubits was awarded a Physics World Top Ten Breakthrough of the Year of 2013. She has published in the Nature family of journals (Nature, Nat. Phys, Nat. Comms, Nat Nano, etc.), Science, the Physical Review family of journals, and her work has been covered by the New York Times, CBC, BBC, Scientific American, the New Scientist, and others.