



Chemical & Physical Sciences
UNIVERSITY OF TORONTO
MISSISSAUGA

COLLOQUIUM
TUESDAY, 10 FEBRUARY 2015
11:00 AM - 12:00 NOON
KN132

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An Inconvenient Truth about Biosignatures on Earth-like Exoplanets

Finding compelling evidence for life on another planet would undoubtedly be one of the biggest discoveries in the history of the human race. There are many places to look for such biosignatures, both in the Solar System and beyond. From the human perspective, the most exciting place is an Earth-twin around a Sun-like star.

Chances are good for finding such a planet within the next few years. However, learning anything other than the planet's existence and its most fundamental properties such as mass and radius will be extremely difficult. I will show a

simple estimate of the amount of information that can be obtained from the most idealized observation possible. Fundamental physics, most importantly photon noise, will prevent us from any detailed analysis of the planet's atmosphere. Even worse, there are false positives that could lead to a fictitious biosignature detection even if multiple chemical species are detected in a spectra. I will present a new false positive involving exo-moons.

