



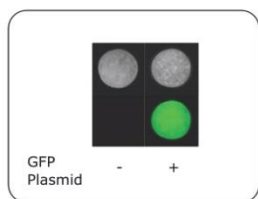
Chemical & Physical Sciences
UNIVERSITY OF TORONTO
MISSISSAUGA

COLLOQUIUM TALK
TUESDAY, MARCH 1, 2016
12:00 NOON – 1:00 PM
IB 260

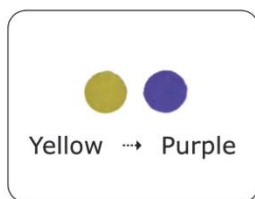
Dr. Keith Pardee
*Leslie Dan Faculty of Pharmacy
University of Toronto*

Paper-based Synthetic Gene Networks

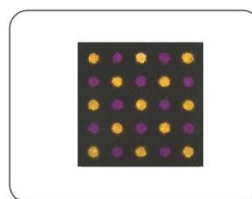
Paper-based Synthetic Gene Networks



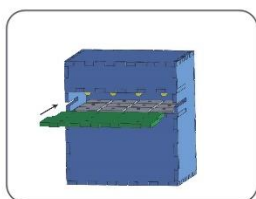
Embedded SGNs



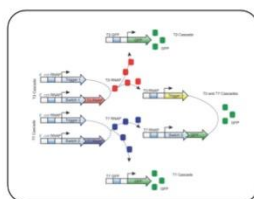
Color output



Printed arrays



Portable reader



Complex assemblies

Synthetic gene networks have wide-ranging uses in reprogramming and rewiring organisms. To date, there has not been a way to harness the vast potential of these networks beyond the constraints of a laboratory or in vivo environment. In this talk, I will present an *in vitro* paper-based platform that provides an alternate, versatile venue for synthetic biologists to operate

and a much-needed medium for the safe deployment of engineered gene circuits beyond the lab.

Commercially available cell-free systems are freeze-dried onto paper, enabling the inexpensive, sterile, and abiotic distribution of synthetic-biology-based technologies for the clinic, global health, industry, research, and education. For field use, we create circuits with colorimetric outputs for detection by eye and fabricate a low-cost, electronic optical interface. This technology has been demonstrated with small-molecule and RNA actuation of genetic switches, rapid prototyping of complex gene circuits, and programmable *in vitro* diagnostics, including glucose sensors and strain-specific Ebola virus sensors.