KYLE MANCHEE

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EDUCATION

PhD Physics – ***Ongoing*** University of Toronto, Toronto ON, Canada	2013 -present
MSc Condensed Matter Physics University of Alberta, Edmonton AB, Canada	2011
BSc Chemical Physics University of Guelph, Guelph ON, Canada	2009

WORK EXPERIENCE

Lab Technician Lester B. Pearson College, Victoria BC, Canada	11/2012 – 06/2013
• Organized the lab space, budgets, and inventory for the Science Department at Pearson College • Aided in preparing and running experiments in Physics, Chemistry, Biology, and Marine Science • Supervised several student-led research projects • Oversaw the safety procedures of the laboratories	
Research Assistant, ***Dr. Al Meldrum*** University of Alberta, Dept. of Physics, Edmonton AB, Canada	09/2011 – 12/2011
• Performed the surface functionalization of fluorescent-core microcapillary sensors (developed in MSc) with a biomolecular binding system in order to demonstrate and study analyte-specific detection • Developed analysis software for time-resolved biosensing measurements • Required extensive coding in *Mathematica*, using the principles of non-linear least-squares curve fitting and discrete Fourier analysis	
M.Sc. Research Project, ***Dr. Al Meldrum*** University of Alberta, Dept. of Physics, Edmonton AB, Canada	09/2009 – 09/2011

• Thesis: Refractometric sensing with fluorescent-core microcapillaries • Involved the preparation and application of silicon nanocrystals for use in optical microcavity systems • Developed a refractometric sensor based on optical resonance for use in microfluidic systems • Project required the design, construction, modeling, testing, and characterization of the sensor system • Skills and techniques: fluorescence spectroscopy, finite-difference time-domain simulation for optical cavity modeling, silicon nanocrystal synthesis, microfluidic system design, computer programing (Matlab, Mathematica), experience with metal machining, computer-aided design of apparatus components (AutoCAD)	
Undergraduate Research Project, ***Dr. John Dutcher*** University of Guelph, Dept. of Physics, Guelph ON, Canada	09/2008 – 04/2009
• Studied the properties of beta-lactoglubulin protein at oil-water interfaces • Used atomic force microscopy to study structural changes in beta-lactoglobulin when environmental stresses, such as changes in temperature and pH, are applied to these protein-stabilized emulsions • Skills and techniques: Atomic force microscopy, force-curve modeling	
NSERC Undergraduate Research Assistant, ***Dr. Stefan Kycia*** University of Guelph, Dept. of Physics, Guelph ON, Canada	05/2008 – 08/2008
• Developed new methods for X-ray diffraction • Designed and built apparatus components for Laue and four circle diffractometers used for single crystal diffraction, powder diffraction, and X-ray fluorescence • Required proficiency with *AutoDesk Inventor* software for component design and use of metal machining and electronics shops where several metal and electrical components were personally built • Skills and techniques: x-ray diffraction, computer-aided design of control boxes (AutoCAD), experience in metal machine shop and electronics workshop	

AWARDS and SCHOLARSHIPS		
NSERC-Alexander Graham Bell Canada Graduate Scholarship (CGS-D) Natural Sciences and Engineering Research Council of Canada	$35,000.00	2014
University of Toronto Admission Award Department of Physics, University of Toronto	$3,000	2013
Ivy A Thomson and William A Thomson Graduate Scholarship University of Alberta	$18,000	2010
Alberta Ingenuity Nanotechnology Top-up Alberta Innovates Technology Futures, *formerly* Alberta Ingenuity	$17,500	2009

NSERC-Alexander Graham Bell Canada Graduate Scholarship (CGS-M) Natural Sciences and Engineering Research Council of Canada	$17,500	2009
J.B. Reynolds Graduation Gold Medal in Physics University of Guelph	Gold Medal	2009

REFEREED PUBLICATIONS

Kelly, Joel A.; Manchee, C.P. Kyle; Cheng, Susan; Ahn, Jun Myun; Shopsowitz, Kevin E.; Hamad, Wadood Y.; MacLachlan, Mark J., "Evaluation of form birefringence in chiral nematic mesoporous materials" *J. Mater. Chem. C 2*(26), 5093 (2014). doi:10.1039/c4tc00451e (*Front Cover*)

McFarlane, S.; Manchee, C.P.K.; Silverstone, J.; Veinot, J.G.C.; Meldrum, A., "Synthesis and operation of fluorescent-core microcavities for refractometric sensing", *Journal of Visualized Experiments* (73), e50256, doi:10.3791/50256 (2013)

McFarlane, S.; Manchee, C.P.K.; Silverstone, J.; Veinot, J.G.C.; Meldrum, A., "Feasibility of a fluorescent-core microcapillary for biosensing applications", *Sensor Letters* 11(8) 1513-1518 (2013).

Zhi, Y.; Manchee, C.P.K; Silverstone, J.W.; Zhang, Z; Meldrum, A., "Refractometric Sensing with Silicon Quantum Dots Coupled to a Microsphere", *Plasmonics* 8(1), 71-78 (2013).

Silverstone, J.; McFarlane, S.; Manchee, C.P.K.; Meldrum, A., "Ultimate resolution for refractometric sensing with whispering gallery mode microcavities", *Opt. Express* 20(8), 8284-8295 (2012).

Manchee, C.P.K.; Zamora, V.; Silverstone, J.; Veinot, J.G.C.; Meldrum, A., "Refractometric sensing with fluorescent-core microcapillaries", *Opt. Express* 19(22), 21540-21551 (2011).

Manchee, C.P.K.; Veinot, J.G.C.; Meldrum, A., "Theory and demonstration of fluorescence-based refractometric sensing in glass micro-capillaries with a silicon nanocrystal-embedded film". *13th International Conference on Transparent Optical Networks ICTON* (2011): 1-4.

NON-REFEREED CONTRIBUTIONS AND PRESENTATIONS

McFarlane, S.; Manchee, C.P.K.; Zamora, V.; Silverstone, J.; Veinot, J.G.C.; Meldrum, A., "Refractometric sensing in silica microcapillaries with nanocrystal-embedded films," *Alberta Quantum-Nano Workshop* (Red Deer, Alberta, July 2011), *poster*

Manchee, C.P.K.; Veinot, J.G.C.; Meldrum, A., "Theory and demonstration of fluorescence-based refractometric sensing in glass micro-capillaries with a silicon nanocrystal-embedded film." *13th International Conference on Transparent Optical Networks ICTON* (Stockholm, Sweden, June 2011), *oral presentation*

RELEVANT ACADEMIC EXPERIENCE

- Alberta Innovates Technology Futures Nanotechnology Showcase (Calgary AB, 2011), *participant*
    - Industrial research showcase and networking opportunity for the technical industry in Alberta

- THECIS Science to Society Workshop, (Banff Centre, Banff 2010), *participant*
    - Multiday workshop focusing on the process of commercializing your academic research
    - Brought students, entrepreneurs, and venture capitalists together to discuss topics including patents and copyrights, company formation, and fundraising strategies
    - Students fully sponsored based on research applications and marketability

- Canadian Institute for Advanced Research (CIFAR) summer session on Nanotechnology (University of Alberta, Edmonton AB, 2010), *participant and tour guide*
    - *Week long student-led conference allowing Canadian graduate students to present and discuss their research to a broad-based interdisciplinary audience*