

KYLE MANCHEE

PhD Candidate, Miller Group
Department of Physics
University of Toronto, ON, Canada

Phone: (647) 862-4522
Email: kmanchee@physics.utoronto.ca

<u>EDUCATION</u>	
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

<u>WORK EXPERIENCE</u>	
<i>Ph.D. Research, Dr. R.J. Dwayne Miller</i> University of Toronto, Dept. of Physics, Toronto ON, Canada	09/2013 – present
<ul style="list-style-type: none">• Design, construction and characterization of high power, ultrafast lasers.• Specialization in Ytterbium-doped gain materials.• Fiber-based, femtosecond oscillators and power amplifiers.• Single mode and large mode area fiber amplifiers. High average power photonic-crystal rod amplifiers.• Bulk amplification. Regenerative amplifier for high pulse energy amplification.• Nonlinear amplifiers (NOPA) for use at 1um and 3um wavelengths.• Extensive beam, laser cavity, and amplifier simulations. Gaussian beam, laser rate dynamics, gain dynamics, nonlinear pulse propagation, nonlinear amplification.• Laser system design. AutoCAD, machining, electronic signalling/triggering and control, systems monitoring, and software design.	
<i>Lab Technician</i> Lester B. Pearson College, Victoria BC, Canada	11/2012 – 06/2013
<ul style="list-style-type: none">• 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
<ul style="list-style-type: none"> 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 <i>Mathematica</i>, 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
<ul style="list-style-type: none"> 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 programming (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
<ul style="list-style-type: none"> Studied the properties of beta-lactoglobulin 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
<ul style="list-style-type: none"> 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 <i>AutoDesk Inventor</i> 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 	
Undergraduate Research Assistant, Dr. Joanne O'Meara University of Guelph, Dept. of Physics, Guelph ON, Canada	05/2007 – 08/2007
<ul style="list-style-type: none"> Assisted in redesigning an entry level Physics course at the University of Guelph Developed student assessments and laboratory activities 	

<i>Laboratory Assistant, Dr. Mark Baker</i> University of Guelph, Dept. of Chemistry, Guelph ON, Canada	09/2006 – 04/2007
<ul style="list-style-type: none"> Involved preparing various arsenic, europium, and yttrium solutions and analyzing them using Raman spectroscopy 	

<u>AWARDS and SCHOLARSHIPS</u>		
<i>University of Toronto Completion Award</i> Department of Physics, University of Toronto	\$2,000	2017
<i>University of Toronto SGS Travel Grant</i> School of Graduate Studies, University of Toronto	\$200	2017
<i>University of Toronto SGS Conference Grant</i> School of Graduate Studies, University of Toronto	\$800	2016
<i>NSERC-Alexander Graham Bell Canada Graduate Scholarship (CGS-D)</i> Natural Sciences and Engineering Research Council of Canada	\$35,000.00	2014
<i>University of Toronto Admission Award</i> Department of Physics, University of Toronto	\$3,000	2013
<i>Alberta Learning Information Service Graduate Student Scholarship</i> Government of Alberta	\$3,000	2011
<i>Ivy A Thomson and William A Thomson Graduate Scholarship</i> University of Alberta	\$18,000	2010
<i>Alberta Ingenuity Nanotechnology Top-up</i> Alberta Innovates Technology Futures, <i>formerly</i> Alberta Ingenuity	\$17,500	2009
<i>NSERC-Alexander Graham Bell Canada Graduate Scholarship (CGS-M)</i> Natural Sciences and Engineering Research Council of Canada	\$17,500	2009
<i>Ontario Graduate Scholarship – Declined to accept NSERC CGS-M</i> Ontario Student Assistance Program	\$15,000	2009
<i>Honorary University of Alberta Master's Scholarship – Declined to Accept NSERC CGS-M</i> University of Alberta	\$22,000	2009

<i>J.B. Reynolds Graduation Medal in Physics</i> University of Guelph	Medal	2009
<i>Queen Elizabeth II Scholarship Aiming for the Top</i> Ontario Student Assistance Program	\$14,000 (4X\$3,500)	2005 -2009
<i>Walter H Johns Graduate Fellowship</i> University of Alberta	\$4,627	2009
<i>Science Graduate Scholarship</i> University of Alberta	\$2,000	2009
<i>NSERC – Undergraduate Student Research Award</i> Natural Sciences and Engineering Research Council of Canada, University of Guelph	\$8,000	2008
<i>James L. Hunt Scholarship in Physics</i> University of Guelph	\$1,500	2008
<i>College of Physical and Engineering Science Dean's Scholarship</i> University of Guelph	\$500	2008
<i>Copernicus Scholarship in Physics</i> University of Guelph	\$500	2007

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

Manchee, C.P.K and Miller, R.J.D., "High-power, Femtosecond Laser Source at 1 μ m for Ultrafast Science," *CSC Canadian Chemistry Conference* (Toronto, Ontario, May 2017), *poster*

Manchee, C.P.K and Miller, R.J.D., "Yb:KGW Regenerative Amplifier for Femtosecond CPA Laser System at 1 μ m," *Photonics North* (Ottawa, Ontario, June 2017), *oral presentation*

Manchee, C.P.K.; Zia, H.; Miller, R.J.D., "Versatile, high-power femtosecond laser source at 1 μ m". *CLEO 2016* (San Jose, CA, June 2016), *poster*

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

- Ongoing development of *beamtools* Python package. Tools aiding in the design and analysis of optical beams and systems
- CSC Ultrafast Science Satellite meeting (Toronto ON, 2017), *presenter and organizer*
- Chemical Biophysics Symposium (Toronto ON, 2013-2016), *participant*
- 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*
- Chemistry/Biochemistry Club (University of Guelph, Guelph ON, 2006-2008), *Vice President*
- College of Physical and Engineering Science Student Council Representative (University of Guelph, Guelph ON, 2006-2008)
- Committee for Laboratory Renewal, *student representative* (University of Guelph, Guelph ON, 2007)
 - Committee to discuss the current status of and establish strategies for updating and improving the laboratory spaces in the College of Physical and Engineering Science

VOLUNTEER EXPERIENCE

- Volunteer Judge, Toronto Science Fair (University of Toronto Scarborough, 2014)
- Peace Core Volunteer, Hillside Community Festival (Guelph ON, 2012-2014)
- Volunteer Supervisor of Group IV project for the IB diploma program (Pearson College, 2013)
- Organized *Sustainability Day* (Pearson College, Victoria BC, 2012)
 - Assisted in preparing a day-long “Special Topics Day” for Pearson College, attended by over 300 students from the College and surrounding community
 - Co-organized several seminars and activities including a keynote lecture by Andrew Weaver, Nobel Laureate
 - Planned and headed an interactive workshop on waste consumption
- Organized and led a 6-day hiking excursion along the Juan de Fuca trail and an overnight winter camping trip in Strathcona Provincial Park for a team of high school students (Pearson College, Victoria BC, 2012-2013)
- Activity leader for kayaking and the community garden (Pearson College, Victoria BC, 2012-2013)
- “Let’s Talk Nanoscience” laboratory tours and demonstrations, *volunteer* (University of Alberta, 2011)

- Guided lab tours and led demonstrations to high school students from the Edmonton area
- Organized the Social Club for Interdisciplinary Science Students (SCISS) (University of Alberta, 2010-2011)
 - A weekly social club where students presented and discussed topics of interest relating to any science discipline
- CIBC Run for the Cure, *fundraiser and participant* (2011-2013)
- World Wildlife Fund, Great Canadian Shoreline Cleanup, *volunteer* (Edmonton AB and Guelph ON, 2011-2013)
- Volunteer and demonstrator at the College Royal Open House (University of Guelph, 2006-2009)
 - Performed chemistry demonstrations for hundreds of community members over the course of the three day festival
 - Helped organize and performed in the “Chemistry Theatre” interactive play, performing chemistry demonstrations in a live theatre setting
- Professional and private ski instructor, CSIA Level 1 and CSCF Level 1 certified (2004-present)