Graduate studies in Physics at Carleton University
Information for September 2014 MSc applicants

physics.carleton.ca

Graduate Studies

Why do it?

- learn more physics
- learn research methodology
- career preparation
- enhance presentation skills
- actually be paid to go to university (> $25k y⁻¹)
- because it’s fun
Graduate Studies

What qualifications do I need?

- Honours B.Sc. in Physics or in Physics combined with Biology, Chemistry, Mathematics, or Computing
- or B.Eng. in Engineering Physics
- at least a B+ average in physics courses (at Carleton, major gpa at least 9.0)
- at least a B- average overall
- competition for the programs means that having the minimum gpa does not guarantee admission
- the other components of your application are very important (personal statement, referee assessments)

The Ottawa-Carleton Institute for Physics (OCIP):
Carleton University + University of Ottawa

- Complementary areas of research
- We have one shared graduate course PHYS 5701 Intermediate Q.M. (location alternates)
- Students can elect to take courses at the other University
- Joint student seminar series
- a faculty member from the “other” university is required on all thesis defenses
- Annual December symposium
Graduate Studies

What will my program be?

- M.Sc. in Physics
- 2 years of study, full time, including summers. Start in September.
- specialization in Particle Physics or in Medical Physics
- 5 courses
- research thesis
- research seminar (OCIP)
- oral defense of thesis
- usually employed as TA 130 h/year

Typical MSc courses

- **Particle Physics ("High Energy Physics")**
  - 5 required (2.5 credits)
  - PHYS 5002  Computational Physics
  - PHYS 5601  Experimental Techniques of Nuclear & Particle Physics
  - PHYS 5602  Physics of Elementary Particles
  - PHYS 5701  Intermediate Quantum Mechanics with Applications
  - PHYS 5702  Relativistic Quantum Mechanics

- other courses as appropriate and as needed
- courses from U Ottawa may be taken
Typical MSc courses

- **Medical Physics**
  - 5 required (2.5 credits)
  - PHYS 5002 Computational Physics
  - PHYS 5203 Medical Radiation Physics
  - 1 of PHYS 5204 Imaging, 5206 Radiation Therapy, 5207 Radiobiology
  - a physics course not in med phys such as 5601 Exp Tech Nucl & Particle
  - 1 more course. e.g. med phys or a prereq such as 4203 Fourier Analysis.

- other courses as appropriate and as needed
- courses from U Ottawa may be taken

for Sept 2014 MSc applicants

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Graduate Studies

**Who will I work with?**

- **Thesis Supervisor**
  - determined at entry to program
  - we do not admit to a "pool" to find a supervisor later
  - choice of supervisor affects choice of courses (especially in med phys)
  - know where your research will be even in first months when courses are priority
  - all students funded from first day of program
  - students and supervisors *choose each other*

for Sept 2014 MSc applicants
Financial support

- all graduate students are supported (2 y for MSc, 5 y for PhD)
- minimum level established for MSc admitted *Sept 2013* was $25,428
- composed of TA, scholarship funding from the Grad School, and RA from thesis supervisor. (the scholarship funds are automatic, you do not need to apply)
- the funding depends on gpa and applicants with strong academic records will be offered up to several $k more
- applicants who win an external scholarship (e.g. NSERC CGS-M, $17,500) will have it replace the RA, plus receive scholarship from the Grad School and offer of a TA.

for Sept 2014 MSc applicants

Graduate Studies

Who do I talk to?

- Graduate Program Supervisor
  Prof. Paul Johns
  grad-supervisor@carleton.ca

- Professors in the programs

- current Grad students

- Graduate Administrator: Eva Lacelle
  for logistics of applying

- 3rd Y students: choose *Honours project* area next year so as to “try out” potential MSc area

- apply for a *USRA* in a potential area

for Sept 2014 MSc applicants
For Fall 2014 (begins September 1) –

Deadline is March 1, 2014 to be considered for funding. We do consider applications after that for funding if space and funds remain.

Where do I start?

- physics.carleton.ca/prospective-graduate-students
Online Application

Step 1

- Request an application account via this site
- submit prescreening information such as courses taken, research interest area, etc. **No fee to do pre-screen.**
- If pre-screen is accepted, an Email containing your login and password will be sent to you
Online Application

- **Step 2**
  - Log in to the online application
  - Fill in forms, submit, pay application fee ($100)

References

- ask two professors who know you
- we really want to hear from the person who is supervising your Honours project
- if you did a USRA or other summer or coop position in the Physics Dept, your supervisor there would be another good reference
- “manage” your References
- your References submit directly via the web
Transcripts

- should be in a sealed envelope
- submit to FGPA (Tory Bldg level 5)
- you do not need a transcript for studies at Carleton

Statement of academic interests and ambitions

- Demonstrate fit
- Highlight aspects of your work that might not be evident from transcript
- Explain any negative aspects of record (e.g. special circumstances that lead to a bad year)
External funding

- Ontario Graduate Scholarships (OGS) ($15,000 y\(^{-1}\))
  - deadline Nov 26 to Eva Lacelle, drafts for feedback to P. Johns by Nov. 11
- Natural Sciences and Engineering Research Council (NSERC) (CGS-M $17.5k y\(^{-1}\))
  - deadline Dec 1 online, drafts for feedback to P. Johns by Nov. 11

Timeline

- **July-Sept**: choose an Honours project to “try out” a physics area that looks interesting to you
- **Oct-Nov**: Submit applications for OGS, NSERC
- **Nov-Dec** (recommended): start the online application
- **Nov-Dec** (recommended): request references from your professors.
- **Dec-Feb**: Complete online application.
- **April-June, or earlier**: Offers of admission are sent.
- **July-Sept**: Registration.
Physics Graduate Prizes and Scholarships

- Jasbir Singh Sidhu Book Award
  - in memory of a former graduate student

- Peter Watson Prize for the Communication of Physics
  - for communicating physics to the non-specialist. e.g. lectures to elementary and high school students and to the general public, interviews and articles written for the popular media,

- Donald R. Wiles Prize for Laboratory Demonstrators

- Robert L. Clarke Graduate Scholarship in Medical Physics
  - $10k entrance scholarship to a new student with no other scholarship.
  - Used to replace TA funding in year 1, giving a chance to achieve higher gpa and perhaps go on to win own external scholarship.

- Kiwanis Club of Ottawa Medical Foundation and Dr. Kanta Marwah Scholarship in Medical Physics
  - awarded on the basis of excellence to a PhD student who has completed all milestones except thesis research
Graduate Studies

Beyond the MSc...

- Ph.D. in Physics
- 4-5 years of study, full time, including summers
- specialization in *Particle Physics* or in *Medical Physics*
- 4 courses
- research thesis
- ...

it is possible to go directly to the PhD program after 1 year in MSc if:
A average in courses, and strong start to research (“fast track”)

Med Phys Accreditation

- our PhD program in Medical Physics has been internationally accredited by CAMPEP, the Commission on Accreditation of Medical Physics Educational Programs
- the first Ontario program to be accredited
- the MSc program in medical physics leads directly to this PhD.
Medical Physics…

…the application of physics to problems involving human health.

- Imaging: MRI, Optical, PET and Nuclear Medicine, X Ray
- Cancer therapy: Radiation Dosimetry and Radiotherapy
- Medical biophysics: Radiation Biology

The program is offered in collaboration with medical physicists from The Ottawa Hospital Cancer Centre, the National Research Council, Health Canada, the University of Ottawa Heart Institute, and The Ottawa Hospital.

The PhD program is accredited by CAMPEP.

Particle Physics…

…the study of the fundamental nature of matter and the basic forces that shape our universe.

- Theory: phenomenology of elementary particles, hadron physics, string theory
- Experiment: detector instrumentation and design, physics simulation, experimental operations and data analysis on the following projects:
  - ATLAS at CERN in Geneva, Switzerland
  - DEAP at SNOLAB in Sudbury, ON
  - EXO at SNOLAB in Sudbury, ON
  - International Linear Collider (ILC)
  - Muon tomography for security imaging

Graduate degree information…

Email: grad_supervisor@physics.carleton.ca

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