Why GRADUATE STUDIES in PHYSICS, ENGINEERING PHYSICS & ASTRONOMY?

The PhD in Physics provides you with training in theory, computation, statistical modelling, and experimental methods as you pursue problems in fundamental and applied research. Physicists design mathematical models to describe complex phenomena and test these models by making observations, conducting experiments, or running numerical simulations. The skills obtained are highly sought after and transferrable to a wide range of fields. The degree leads to careers in academia and government-funded research centres as well as the private sector fields of finance, medicine, technology, and data analytics, to name just a few.

Why QUEEN’S?

Queen’s has one of the most active and dynamic physics departments in Canada. The Department is home to the McDonald Institute, a national research centre in particle astrophysics. Named after emeritus Queen’s professor and 2015 Nobel laureate Art McDonald, the Institute is closely linked to activities at SNOLAB where experiments search for dark matter and probe fundamental properties of neutrinos. Closely related is the Astrophysics group whose members at Queen’s and the nearby Royal Military College study galaxies, the extragalactic Universe, black holes and dark matter through theory, simulation, and observations at some of the world’s largest observatories. Research within the applied and engineering physics group seeks to bring new physics understanding to important problems for society, including lighting technologies, solar energy, laser manufacturing and non-destructive testing while the Condensed Matter and Optics group focuses on nanophotonics and quantum optics. Group members are key players in NanoFabrication Kingston, a University-Industry collaboration that provides researchers with access to leading-edge equipment and expertise for the design of nanotechnologies.

Program STRUCTURE

PhD (4 years): Course work, research project, thesis & defense, seminar series.

RESEARCH Areas

- Condensed Matter Physics & Optics
- Engineering & Applied Physics
- Astrophysics & Astronomy
- Particle Physics & Particle Astrophysics

We encourage you to identify an area of research interest and contact a potential supervisor before applying.

Visit the Department of Physics, Engineering Physics & Astronomy website to read faculty profiles and learn more about faculty members’ research areas. When you find a faculty member with similar research interests to yours, contact him/her and tell them about your interest in graduate work and related experience.
**ACHIEVE YOUR ACADEMIC GOALS**

- Meet early with your supervisor to set expectations and discuss roles, responsibilities, program requirements, resources, research/occupational goals, timelines, and any required accommodation plans.
- Look to Student Academic Success Services for a variety of supports.
- Attend and participate in graduate seminars and colloquia hosted by the department.

**MAXIMIZE RESEARCH IMPACT**

- Think about audiences for your research.
- Complete CORE online module on research ethics if doing research with living people or sensitive topics.
- Apply to NSERC, OGS, and other funding sources.
- Attend conferences in your field, such as the **Canadian Association of Physics Annual Congress**.
- Apply for the **Graduate Dean's Travel Grant for Doctoral Field Research**.

**BUILD SKILLS AND EXPERIENCE**

- Serve on departmental, faculty or university committees. Talk to the **Society for Graduate Students** for tips on getting involved.
- Consider positions in student services, the **SGPS**, or media outlets like the **Queen's Journal**, **CFRC**, and the **SGS Blog**. Look in the **AMS Clubs Directory**.
- Like a Teaching Assistant or Research Assistant position to develop your skills and experience.
- Hone skills for non-academic employment by continuing involvement on committees and in the community.
- Start keeping an ePortfolio of your skills, experiences and competencies.
- For help with teaching, get support from the **Centre for Teaching and Learning**. Enroll in **SGS902**, the **PUTL certificate** for more professional development in teaching and learning.

**ENGAGE WITH YOUR COMMUNITY**

- Consider volunteering with different community organizations, such as the **Martha's Table**, or **LOVING Spoonful**.
- Take advantage of the facilities linked to the department, including the **Cancer Centre of Southeastern Ontario**, the **Sudbury Neutrino Observatory (SNOLAB)**, the **Kingston Nano-Fabrication Laboratory (KNFL)**, and more.
- Participate in your graduate and professional community through activities such as graduate student outreach programs, organizing conferences, and research groups.
- Do some targeted networking with people working in careers of interest, through **QueenConnects on LinkedIn**, the **Queen's Alumni Association**, professional associations, and at conferences. Get help from a **Career Services workshop**.

**LAUNCH YOUR CAREER**

- Finding career fit starts with knowing yourself. Take a **Career Services workshop** or meet with a career counsellor. Check out books like **What Are You Going to Do With That?** or Planning a Scientific Career in Industry from the **Career Resource Area** for advice on various career options.
- Start reading publications like **University Affairs and the Chronicle of Higher Education**. Browse non-academic labour market websites.
- Stay on the lookout for special events like **School of Graduate Studies Career Week** to explore your career pathways.

- Start building your teaching portfolio including student evaluations, and seeking mentorship.
- Explore different careers of interest by reading **alumni profile** on the SGS website, and using **QueenConnects on LinkedIn** to connect with Queen's alumni, or find alumni in various careers through **Ask an Alum**. For more information check out **Career Cruising**.
- Investigate requirements for professional positions or other opportunities related to careers of interest.
- Participate in hiring committees and attend job talks. Research academic careers of interest. Craft your CV and job application materials.
- Start focusing on non-academic areas of interest. Research organizations of interest and start putting together your resume for potential positions of interest.
- Participate in communities related to careers of interest, like **Career Cruising**, **Ask an Alum**, **SGPS**, and more.

**WHAT WILL I LEARN?**

A graduate degree in Physics, Engineering Physics & Astronomy can equip you with valuable and versatile skills, such as:

- Knowledge and technical skills
- Effective communication skills in multiple forms for diverse audiences
- Information management: prioritize, organize and synthesize large amounts of information
- Time management: meet deadlines and manage responsibilities despite competing demands
- Project management: develop ideas, gather information, analyze, critically appraise findings, draw and act on conclusions
- Creativity and innovation
- Perseverance
- Independence and experience as a collaborative worker
- Awareness, an understanding of sound ethical practices, social responsibility, responsible research and cultural sensitivity
- Professionalism in all aspects of work, research, and interactions
- Leadership: initiative and vision leading people and discussion

**WHERE CAN I GO?**

A PhD degree in Physics, Engineering Physics & Astronomy can take your career in many directions. Our PhD students are equipped with a strong foundation for careers in:

- Academia and research
- Consulting
- Medical technologies: radiation physics, x-ray physics
- Renewable energy
- Technology sector

Taking time to explore career options, build experience, and network can help you have a smooth transition to the world of work after graduation.

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**YEAR I**

- Write and defend your thesis proposal.
- Embark on your substantive research.
- Set up regular meetings with your supervisor to discuss progress and obstacles to timely completion.
- Find your way through the academic process with the help of **Expanding Horizons**.
- Seek experiential/professional development opportunities.

**YEAR II**

- Continue to meet regularly with your supervisor, review research progress, and write your dissertation. Check out the SGS **Dissertation Boot Camp** or **Dissertation on the Lake**.
- Consider publishing elements of your research. Learn from the **Expanding Horizons Publishing workshop**.
- Begin discussion of potential thesis defence examiners.

**YEAR III**

- Plan date of thesis submission for examination.
- Present your research to graduate students and faculty at the program and work with supervisor to prepare for defence.
- Review submission and examination guidelines.
- Secure necessary oral defence accommodations.
- Discuss career pathways, references letters, and publication options with your supervisor.

- Continue to present at conferences.
- Consider participating in the **3 Minute Thesis (3MT) competition**.
- Contact the **Queen's Media Centre** for guidance on speaking to news outlets about your work.
- List yourself on the **Arts and Science University Research website**.

**YEAR IV & TRANSITIONING**

- Continue to attend conferences such as the **Canadian Astronomical Society Annual Meeting** or the **Canadian Association of Physicists Congress**, and connect with scholars in your field and with community partners.
- Continue public outreach through social media and the Queen's Media Centre.

- Practice articulating the skills you have been developing in settings outside the university, such as casual conversation, networking, and interviews. Get help from a **Career Services workshop**.

- Consider joining professional societies like the **Canadian Association of Physicists**.
- Join groups on LinkedIn reflecting specific careers or topics of interest.

- Consider publishing elements of your research. Learn from the **Expanding Horizons Publishing workshop**.
- Begin discussion of potential thesis defence examiners.

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**2019-2020**

**Physics, Engineering Physics & Astronomy PhD MAP**

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Visit careers.queensu.ca/gradmaps for the online version with links!
Application FAQs

What do I need to know to APPLY?

ACADEMIC REQUIREMENTS
- Master’s degree in Science or Applied Science.
- **Grade requirements:** minimum B+ standing.

ADDITIONAL REQUIREMENTS
- Two official transcripts for all post-secondary studies.
- At least 2 letters of reference.
- Curriculum vitae.
- If English is not a native language, prospective students must meet the English language proficiency requirements in writing, speaking, reading, and listening. The School of Graduate Studies requires the following minimum scores: TOEFL (paper-based): 550, (2) TOEFL iBT: Writing (24/30); Speaking (22/30); Reading (22/30); Listening (20/30), for a total of 88/120 (applicants must have the minimum score in each test as well as the minimum overall score), or (3) IELTS: 7.0 (academic module overall band score), or (4) PTE Academics: 65.

KEY DATES & DEADLINES
- **Application due:** February 15th.
- **Notification of acceptance:** 4 weeks after the full application has been received.

Before you start your application, please review the graduate studies application process.

What about FUNDING?

The minimum funding guarantee for Physics PhD students is $27,500 per year, throughout years 1-4. This basic level funding consists of graduate awards, external scholarships, teaching assistantships, and support from your supervisor.

We encourage all students to apply for external funding from OGS, NSERC and other sources. Queen’s will automatically issue a one time $10,000 award to Doctoral students who have won federal government tri-council awards. For more information, see the School of Graduate Studies’ information on awards and scholarships.

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