# Physics, Engineering Physics & Astronomy PhD Map

### Applying to and Navigating Graduate Studies

### Why GRADUATE STUDIES in PHYSICS, ENGINEERING PHYSICS & ASTRONOMY?

The PhD in Physics provides you with training in theory, computation, statistical modeling, 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 transferable to a wide range of fields. The degree leads to careers in academia and governmentfunded 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

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

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

Visit the <u>Department of Physics</u>, <u>Engineering Physics & Astronomy website</u> 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 them and tell them about your interest in graduate work and related experience.





GRADUATE STUDIES AND POSTDOCTORAL AFFAIRS

# 2023-2024 Physics, Engineering Physics & Astronomy PhD Map

DOCTOR OF PHILOSOPHY (PhD)

	YEAR I	YEAR II	YEAR III	YEAR IV & TRANSIT
ACHIEVE YOUR ACADEMIC GOALS	<ul> <li>Meet early with your supervisor to set expectations and discuss roles, responsibilities, program requirements, resources, research/ occupational goals, timelines, and any required accommodation plans.</li> <li>Look to <u>Student Academic Success Services</u> for a variety of supports.</li> <li>Attend and participate in graduate seminars and colloquia hosted by the department.</li> </ul>	<ul> <li>Write and defend your thesis proposal.</li> <li>Embark on your substantive research.</li> <li>Set up regular meetings with your supervisor to discuss progress to timely completion.</li> <li>Find your way through the academic process with the help of <u>School of Graduate Studies and</u> <u>Postdoctoral Affairs professional development</u>.</li> <li>Seek experiential/professional development opportunities.</li> </ul>	<ul> <li>Continue to meet regularly with your supervisor, review research progress, and write your dissertation. Check out the <u>SGSPA</u>. writing camps.</li> <li>Consider publishing elements of your research.</li> <li>Begin discussion of potential thesis defence examiners.</li> </ul>	<ul> <li>Plan date of these</li> <li>Present your resend faculty or at supervisor to present your resend faculty or at supervisor to present the supervisor of the supervisor</li></ul>
MAXIMIZE RESEARCH IMPACT	<ul> <li>Think about audiences for your research.</li> <li>Complete CORE online module on research ethics if doing research regarding sensitive topics.</li> <li>Apply to NSERC, OGS, and other funding.</li> </ul>	<ul> <li>Present your work at graduate conferences, through professional associations, or topic conferences.</li> <li>Expand your research audience through social media such as Twitter or a blog.</li> <li>Apply for the Graduate Dean's Travel Grant for Doctoral Field Research.</li> </ul>	<ul> <li>Consider participating in the <u>3 Minute Thesis</u> (<u>3MT</u>) competition.</li> <li>Contact the <u>Queen's Media Centre</u> for guidance on speaking to news outlets about your work. List yourself on the <u>Arts and</u> <u>Science University Research website</u>.</li> </ul>	<ul> <li>Continue to atten and connect with community partr</li> <li>Continue public of and the Queen's</li> </ul>
BUILD SKILLS AND EXPERIENCE	<ul> <li>Serve on departmental, faculty, or university committees. Talk to the <u>Society for Graduate</u> and Professional Students for tips on getting involved.</li> <li>Consider positions in student services, the SGPS, or media outlets like the Queen's Journal, CFRC, and the SGSPA Blog. Look in the <u>AMS</u> Clubs Directory.</li> <li>Use a Teaching Assistant or Research Assistant position to develop your skills and experience.</li> </ul>	<ul> <li>Hone skills for non-academic employment by continuing involvement on committees and in the community.</li> <li>Start keeping an ePortfolio of your skills, experiences, and competencies.</li> <li>For help with teaching, get support from the <u>Centre for Teaching and Learning</u>. Enrol in SGS902 or the PUTL Certificate for more professional development.</li> </ul>	<ul> <li>Investigate internships from <u>MITACS</u> and other sources.</li> <li>Find opportunities for extra training through CTL, School of Graduate Studies and Postdoctoral Affairs professional development, or other sources to boost your skills.</li> <li>Prepare for work or studies in a multi-cultural environment by taking the Intercultural Awareness Training Certificate hosted by QUIC and FDISC.</li> </ul>	<ul> <li>Practice articulat developing in set such as casual co interviews. Get h workshop.</li> </ul>
ENGAGE			>	>
WITH YOUR COMMUNITY	<ul> <li>Consider volunteering with different community organizations, such as Martha's Table and Loving Spoonful.</li> <li>Take advantage of the facilities linked to the department, including the <u>Cancer Centre of</u> <u>Southeastern Ontario</u>, the <u>Sudbury Neutrino</u> <u>Observatory (SNOLAB)</u>, the <u>Kingston Nano- Fabrication Laboratory (KNFL</u>), and more.</li> </ul>	<ul> <li>Participate in your graduate and professional community through activities such as graduate student outreach programs, organizing conferences, and research groups.</li> </ul>	• Do some targeted networking with people working in careers of interest, through Queen's Connects on LinkedIn, the <u>Queen's</u> <u>Alumni Association</u> , professional associations, and at conferences. Get help from a Career Services workshop.	<ul> <li>Consider joining field.</li> <li>Join groups on Li careers or topics</li> </ul>
LAUNCH YOUR		<u> </u>	>	<u> </u>
CAREER	<ul> <li>Finding career fit starts with knowing yourself. Take a <u>Career Services workshop</u> or meet with a career educator and coach for help.</li> <li>Start reading publications like <u>University Affairs</u> and the <u>Chronicle of Higher Education</u>. Browse non-academic labour market websites.</li> <li>Stay on the lookout for special events like School of Graduate Studies and Postdoctoral Affairs Career Week to explore your career pathways.</li> </ul>	<ul> <li>Start building your teaching portfolio including student evaluations, and seeking mentorship.</li> <li>Explore different careers of interest by using <u>Queens Connects</u> on LinkedIn to connect with Queen's alumni. For more information check out Career Cruising.</li> <li>Investigate requirements for professional positions or other opportunities related to careers of interest.</li> </ul>	<ul> <li>Participate in hiring committees and attend job talks. Research academic careers of interest. Craft your CV and job application materials.</li> <li>Start focusing on non-academic areas of interest. Research organizations of interest and start putting together your resume for potential positions of interest.</li> </ul>	<ul> <li>Build connection department. Purs positions and app and positions.</li> <li>Apply to jobs or r adventures.</li> <li>If considering job immigration regu- international stud- in Canada, considering Job</li> </ul>

#### How to use this map

Use the 5 rows of the map to explore possibilities and plan for success in the five overlapping areas of career and academics. The map just offers suggestions – you don't have to do it all! To make your own custom map, use the My Grad Map tool.



### TIONING

- esis submission for examination.
- esearch to graduate students at conferences and work with prepare for defence.
- ssion and examination guidelines.
- ary oral defence accommodations.
- pathways, references letters, and tions with your supervisor.
- tend conferences in your area, vith scholars in your field and with rtners.
- ic outreach through social media n's Media Centre.
- ating the skills you have been settings outside the university, conversation, networking, and help from a Career Services
- ng professional societies in your
- LinkedIn reflecting specific ics of interest.
- ons with faculty outside of your ursue interviews for faculty apply for post-doc fellowships
- or make plans for other
- jobs abroad, research possible egulations. If you are an tudent interested in staying sider speaking with an tudent Advisor.

### 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.

# Graduate Studies FAQs

## How do I make the most of my time at Queen's?

Use the Grad Map to plan for success in five overlapping areas of your career and academic life. Everyone's journey is different - the ideas on the maps are just suggestions to help you explore possibilities. For more support with your professional development, take advantage of the SGSPA professional development framework and the new Individual. Development Plan (IDP) process to set customized goals to help you get career ready when you graduate.

### Where can I get help?

Queen's provides you with a broad range of support services from your first point of contact with the university through to graduation. Ranging from help with academics and careers, to physical, emotional, or spiritual resources – our welcoming environment offers the programs and services you need to be successful, both academically and personally. Check out the <u>SGSPA website</u> for available resources.

### What is the community like?

At Queen's, graduate students from all disciplines learn and discover in a closeknit intellectual community. You will find friends, peers and support among the graduate students enrolled in Queen's more than 130 graduate programs within 50+ departments & research centres. With the world's best scholars, prize-winning professional development opportunities, excellent funding packages and life in the affordable, historic waterfront city of Kingston, Queen's offers a wonderful environment for graduate studies. Queen's is an integral part of the Kingston community, with the campus nestled in the core of the city, only a 10-minute walk to downtown with its shopping, dining and waterfront. For more about Kingston's history and culture, see Queen's University's Discover Kingston page.



# Graduate 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 following minimum scores are required: (1) TOEFL iBT: Writing (24/30); Speaking (22/30); Reading (22/30); Listening (20/30). Applicants must have the minimum score in each test as well as the minimum overall score, or (2) IELTS: 7.0 (academic module overall band score and a 7.0 for each test band), or (3) PTE Academics: 65, or (4) CAEL CE -70 (minimum overall score).

#### **KEY DATES & DEADLINES**

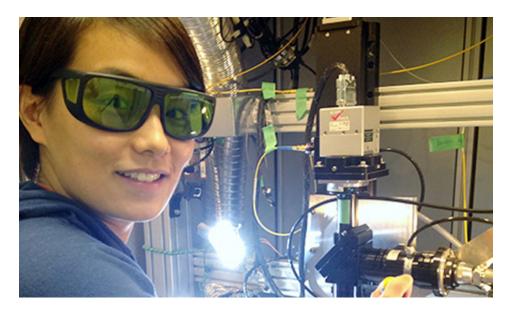
- Application due: January 7th.
- **Notification of acceptance:** 4 weeks after the full application has been received.

Before you start your application, please review the <u>graduate studies application</u> <u>process</u>.

### What about FUNDING?

The minimum funding guarantee for Physics PhD students is \$30,150 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 and Postdoctoral Affairs' information on <u>awards and scholarships</u>.



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