Undergraduate Summer Research 2026 at Department of Pharmacology and Toxicology, University of Toronto (in-person)

Programme Overview

University of Toronto (UofT)'s Department of Pharmacology and Toxicology is the largest pharmacology and toxicology department in North America. It is situated in a downtown research hub consisting of the core department located on campus and affiliates located at internationally-recognised hospital-based research institutes. The department has outstanding and diverse research environment in clinical pharmacology, drug discovery, drug toxicity, cancer, neuropharmacology/addiction and pharmacogenetics.

Requirements

- Students will conduct research for 10 to 12 weeks in a faculty member's laboratory
- Students will be enrolled in PCL courses (1.5 UofT credits) with course requirements including:
  - project proposal
  - written reflections
  - oral presentations
  - brief scientific communications
  - final written report

Refer to the department's website and the Undergraduate Summer Research page for more information on the programme.

The list of projects available can be found at the end of this document. **DO NOT contact the UofT supervisors at this stage of application.**

Location

The programme takes place in Toronto, Canada (St. George campus).

Dates

The exact period of exchange should be negotiated between the student and the supervisor. Due to the minimum duration requirement and the NUS academic calendar, the period of exchange should be 10 to 12 weeks long and fall within the NUS Special Term: **11 May 2026 – 1 August 2026**.

Credit Transfer

This programme may be mapped to a 4-unit UROPS course code or a 4-unit department dummy exchange course code (counting towards unrestricted electives).

Refer to the course mapping instructions (with effect from AY26/27) and credit transfer policy (with effect from AY26/27) found on the FoS SEP website for information on course mapping and credit transfer. Do note that there is an exception for Overseas Summer UROPS regarding the number of credits that can be transferred.

Additional assessment may be required by the NUS department for transferring of credits. Not all UROPS course code can be counted towards major requirements. Please check which graduation requirement the UROPS will count towards and if you are unsure, please check with your department.

Students can transfer a total of 12 units from a maximum of 2 overseas summer/winter programmes without having to pay NUS tuition fee during their course of study. Any additional units mapped will be subjected to NUS Special Term fees.

Eligibility Criteria

NUS students must:

- Be a full-time Faculty of Science student, with a primary major in science
- Preferably have completed courses in Physiology, Biochemistry/Molecular Biology and Statistics
- Have a clean disciplinary record
- Have completed 4 – 6 semesters in NUS by the start of the programme (i.e. current Year 2 and Year 3 students)
- Have a minimum GPA of 4.0
- Not be intending to graduate at the end of AY2025/2026 Semester 2
- Not be called up for National Service during the programme dates. A deferment letter will not be provided.

An internal offer does not guarantee your placement in the programme. Your admission outcome is at the discretion of the partner institution.

Number of Places

There are 2 places available.

Programme Cost

Students do not need to pay NUS Special Term fees or tuition fees to University of Toronto if they do not exceed the credits transfer limit stated under the section "Credit Transfer" above. However, students are responsible for their own airfare, accommodation, meals, personal expenses, etc.

Estimated cost (*Please note that the figures provided are only estimates*)

Item	Cost
Return Airfare	SGD2,000
Accommodation	SGD4,000
Food and Transport	SGD2,500

Please visit this page for further information regarding on-campus lodging.

Financial Assistance

The financial aid available for this programme are the NASA Enhancement Bursary, the Science Student Overseas Exposure Fund (SSOEF), and the Opportunity Enhancement Grant (OEG). Students may also apply for the Overseas Student Programme (OSP) Loan. Refer to the respective links for more information.

Please note that application for NASA Enhancement Bursary should be done through EduRec, as mentioned in the page linked above. Do not apply for NASA Enhancement Bursary through the application form linked in the FoS Financial Assistance Schemes page.

Programme Application Procedure and Deadline

Login to EduRec and submit your application under External Study Type “Research Attachment/Internship/ Industrial Attachment”, External Study Setup ID: **03599**. Please refer to the Guide for Student Programme Application before starting your application.

Application Deadline: **Tuesday, 16 December 2025, 11:59pm Singapore Time**

Documents required (upload into your online application in EduRec):

1. Latest NUS unofficial transcript
2. Curriculum Vitae – Highlight any prior research experience that you may have to support your application
3. Personal Statement – Provide statement of research interest and future goals, including the area of your research interest. Indicate the project you intend to apply for and why you are interested in that project. Please do not contact the research supervisor at UofT for a placement before receiving an internal offer from NUS.

Note:

- Students who receive an offer from NUS are required to submit a separate application to UofT.
- Admission into the programme is at the discretion of UofT. The NUS internal offer and subsequent nomination to University of Toronto does not guarantee your placement in the programme.

If you face difficulties uploading the documents, submit the required documents via SCI UG Queries (category: SAP) by **16 December 2025, 11:59pm Singapore Time**.

Applications would be **deemed incomplete if the required documents are incomplete or not submitted** by the stipulated deadline, and therefore disqualified from the application.

To be fair to students who abide by the deadline, incomplete or late application will strictly not be considered.

Insurance

All students travelling overseas for activities or purposes approved, endorsed, organised, sponsored or authorised by NUS will be covered by the NUS Student Travel Insurance Policy. Click here for more information.

Exclusions to the NUS Student Travel Insurance may apply. Students are to ensure that they have sufficient travel insurance coverage and may consider purchasing additional travel insurance if required.

Contact

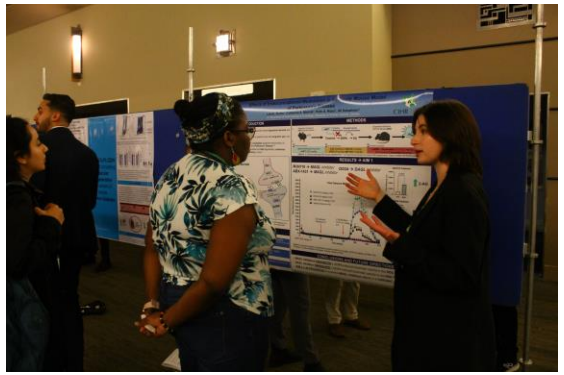
If you have any questions, please submit your enquiry via SCI UG Queries (category: SAP).

Updated: 5 December 2025

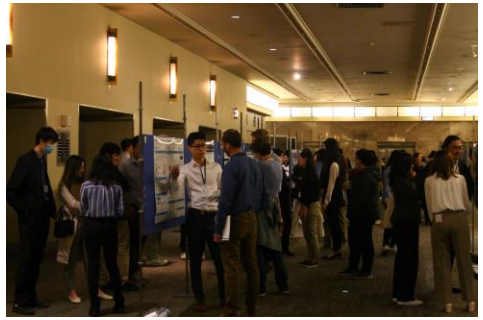
Do not contact the supervisors unless you have been given an internal offer from FoS.

Supervisor	Email	Positions	Project Description	Cllinical/non-clinical
Dr. Nathanael Caveney	n.caveney@utoronto.ca	1	**Structural characterisation of interferon signalling by cryoEM**. Interferons are a vital group of signalling molecules that are largely known to assist in the control of viral infection. While these are a key component of the human viral defence response, there are key gaps in our knowledge of the molecular understanding of the interactions between interferons and their cognate receptors. This project will revolve around the expression, purification, sample prep, and cryoEM imaging of interferon signalling complexes to further this understanding and provide a platform for targeted therapeutic interventions in viral infection.	non-clinical
Dr. Wai (Ho) Hung Yu	haung.yu@utoronto.ca	2	**A choice of one of 5 projects upon discussion with Dr. Yu.** 1) Extracellular vesicles (EV) are ubiquitous to all cells and organisms and serve as a way to exchange materials and communicate between cells. It is also a mechanism **f**or transfer of pathology. In this project, the applicant will isolate and characterize EVs to identify materials and potential for pathological spread. 2) Sleep impairment is a risk factor for Alzheimer's disease and in this project, the applicant will work with brain tissue and plasma samples to identify neuropathological changes that may arise from sleep impairment to identify their contribution to disease progression and possible utility as a biomarker of disease, and how pharmacological intervention slows/stop neuropathological and biochemical changes. 3) Bioinformatics - Using datasets generated from project 2, we will identify common pathways that are impacted in AD with sleep impairment and pharmacological intervention. 4) Bioinformatics - While we are developing significant knowledge of genetic and phenotypic risk factors for Alzheimer's disease, there are still significant unknowns, including how race or lived experiences can play a role in risk or protection. Using data collected from a Canada+US study, we will work on identifying potential risks like cardiovascular, pharmacogenetics, metabolic factors and compare to existing datasets. 5) Bioinformatics - Using plasma samples collected from our Asian cohort, we will assess current biomarkers of AD as well as potentially new ones to identify potential diagnostics.	clinical or non-clinical
Dr. Leonardo Salmena	leonardo.salmena@utoronto.ca	2	**Further project details will be discussed upon interview with Dr. Salemena.** 1) Identifying novel microRNA targets for the treatment of glioblastoma 2) Investigating the basis of pancreatic cancer metastasis and immunosuppression.	non-clinical
Dr. Jack Uetrecht	jack.uetrecht@utoronto.ca	1	**Mechanisms of Idiosyncratic Drug Reactions.** The focus of the research in my lab is the study of the mechanisms of idiosyncratic drug reactions (IDRs). IDRs are a significant problem. The most common target is the liver, and almost 20% of drug candidates fail because of idiosyncratic drug-induced liver injury. A practical consequence of such study would be the discovery of biomarkers that would predict IDR risk in drug candidates, which is currently totally inadequate. The adaptive immune response that leads to IDRs is idiosyncratic because it requires specific HLA haplotypes and T cell receptors. However, an innate immune response is required to produce an innate immune response, and the innate immune response should not be idiosyncratic and has the potential to uncover predictive biomarkers. We use a variety of in vivo and in vitro methods to determine the initial clinically silent response to drugs that cause IDRs.	non-clinical
Dr. Rachel Harding	rachel.harding@utoronto.ca	1	**Identification of new chemical starting points to develop drugs to treat rare, inherited degenerative diseases such as spincerebllar ataxias and spinal bulbar muscular atrophy.** In this project you will purify protein targets of interest which will be deployed in the SGC's ligand discovery platform. Hit molecules will be validated with biochemical, biophysical and structural approaches to provide a launch pad for future medicinal chemistry campaigns.	non-clinical

Why the Department of Pharmacology & Toxicology?



- Departmental faculty and trainees are diverse and international
  - ~30% of student population is International
- Opportunities to network and join community
  - Undergrad. summer research program, 4th yr students completing “mini-thesis”
  - Attend departmental & faculty research seminars,
    - Visions in Pharmacology Research Day
    - TFoM Research Day
  - Departmental Community Initiatives
  - Mentorship programs*



Pharmacology & Toxicology
UNIVERSITY OF TORONTO

Why the Department of Pharmacology & Toxicology?

- Largest pharmacology and toxicology department in North America
  - ~450 undergraduates in P&T programs
  - ~180 graduate students
  - ~120 faculty members
- Situated in downtown research hub consisting of the core department located on campus and affiliates located at internationally-recognized hospital-based research institutes
  - *The Hospital for Sick Children*
  - *University Health Network*
  - *Centre for Addiction and Mental Health*
  - *Sunnybrook Hospital Research Institute*
  - *Structural Genomics Consortium*
  - *Ontario Institute for Cancer Research*
  - *Unity Health*
- Outstanding and diverse research environment:
  - clinical pharmacology,
  - drug discovery,
  - drug toxicity,
  - cancer,
  - neuropharmacology/addiction,
  - pharmacogenetics

Pharmacology & Toxicology
UNIVERSITY OF TORONTO

Course Requirements and Expectations

- Students will conduct research for 10-to-16-week period in a faculty member's laboratory between May 1st and Aug 31st .
- Students will be enrolled in PCL courses (1.5 U of T credits) with course requirements including:
  - project proposal
  - written reflections
  - oral presentations
  - brief scientific communications
  - final written report
- Students will learn critical thinking skills and independence in conducting their summer research program
- Communication of scientific data and appraisal in lab meetings, course "update" talks and opportunity to fine tune written communication skills
- Students will be asked to convey their research and reflect upon their experience in a clear and concise manner

Requirements

- Nomination from Home Institution

- Acceptance of student by a research supervisor
  - Nominated students should reach out to a potential supervisor from the list of available PCL summer research projects, to request an interview.
  - Students should contact the Department of Pharmacology & Toxicology to inform which host researchers they have contacted.
  - Students must complete the PCL Summer Research Statement of Interest Form and obtain their supervisor's signature on the form by the application deadline.

- Complete application by **January 15, 2026**
  - Academic transcript, English test result (if applicable), PCL Summer Research Statement of Interest Form & resume/CV, course descriptions
  - Minimum grades, cGPA of ~3.3 (~B+) in completed course work

- All Immigration requirements fulfilled (consider the time requirements!)
  - Campus sites – Canadian study permit

FAQ

- Are students eligible to be paid?
  - Students will not be paid (hourly wage) during course taken for credit

- What qualifications do students require to apply to PCL397Y course?
  - Students should have a MINIMUM of one year however two years^{+} preferred
    - Coursework in Physiology, Biochemistry/Molecular Biology highly desired
    - Statistics course or exposure ideal
    - Pharmacology/toxicology courses may not be required, project dependent