Warning

Make sure you are viewing the correct slide deck (green highlights) that is applicable to the semester for which you are considering starting UROP, as requirements may change.

This deck is for AY 22/23 Sem 1, presented on 28 September 2022, for prospective UROP students formally starting in January 2023.

Objective
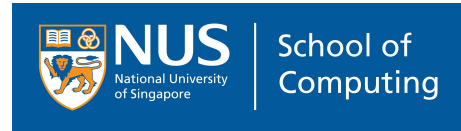
Allows undergraduates to participate in active research and to experience first hand the challenges and exhilaration of research, discovery and invention.

Typically, research involves these activities:

- Problem formulation;
- Literature survey;
- Attending research seminars;
- Proposal and implementation of solutions and evaluation; and
- Documentation and presentation of results.

CP3209 UROP @ SoC

Prerequisites

- Have at least 60 MCs in progress/completed by the application time point.
- Minimum CAP of 3.8
- Approval of CS/IS department

Timelines

Activity	Deliverables
1. Continuous Assessment : CA Report a) Deadline for submission of CA report to supervisor and main evaluator. b) Presentation to supervisor and main evaluator.	a) Wed, Week 12, Sem 2 b) Reading Week, Sem 2
2. Final Assessment Deadline for submission of **Final Report**	Wed of Week 12, Sem 1
3. Presentation	Reading Week, Sem 1
4a) Submission of **Feedback** of UROP Guidance and Evaluation 4b) Submission of **e-copy** of Final Report	First Mon after Exams, Sem 1

Evaluation

30% Continuous Assessment (Interim Progress Report)	
15% Supervisor	30% Understanding of the problem 40% Technical Achievement 10% Project and Resource Management 20% Report and Discussion
15% Main Evaluator	

70% Final report & Oral Presentation	
35% Supervisor	20% Understanding and formulation of the problem 10% Extension of knowledge 30% Methodology, Implementation and Analysis 20% Report 20% Effort & Initiative
35% Main Evaluator	

If the supervisor and main evaluator agrees that the student can continue the project, you will be automatically registered for CP3209 next semester; and will receive an 'IP' grade for this semester.

Schedule <mark>(Sem 1 AY22/23)</mark>

3 October 2022: UROP applications open

- Submit the UROP application via the online application form here.
- You will be informed via email once your application is processed.

11 November 2022: UROP applications close

Finding Projects

Approach the faculty!

- Browse both the UROP and FYP project lists at https://mysoc.nus.edu.sg/~projadm/
- Talk with any faculty that whose area is of interest to you.
- You should look through projects and ask the faculty to propose something similar.

You can also propose your own project. You will still need to find a professor to supervise you.

Bottom line: Take the initiative to find the best project and mentor that fits your interests and advising style

U135530	Parallel Simulation of Biodiversity for Games	BHOJAN, Anand
U135540	VR/AR exercise game development for Neurorehabilitation	BHOJAN, Anand
U220010	Reinforcement learning for scaling quantum simulator arrays	LIM Youliang, Brian
U201010	High-performance Posit Arithmetic Library for Machine Learning	CARBUNARU, Cristina
U294010	Distributed graph algorithms	CHANG Yi-Jun
U294020	Distributed graph algorithms	CHANG Yi-Jun
U011580	Sports Analytics using Probabilistic Model Checking, Computer Vision and Machine Learning	DONG JINSONG
U107160	Automatic Structures	STEPHAN, Frank Christian
U107170	Inductive inference	STEPHAN, Frank Christian
U295040	Designing an Intelligent Robo-Advisor	Frank XING Zhutian
U295050	Risk Mitigation Methods in Crypto Trading Algorithms	Frank XING Zhutian
U317010	Artificial Intelligence Education - Self guided learning	Ganesh NEELAKANTA IYER
U317020	Applying Artificial Intelligence techniques for music nature identification and classification	Ganesh NEELAKANTA IYER

U032300	3D object generation using differentiable rendering	HUANG ZHIYONG
U032310	AI-augmented colonoscopy	HUANG ZHIYONG
U243090	Maximizing Storage Efficiency in DNA-Based Data Storage	JEVDJIC, Djordje
U243100	Open-ended project in computer architecture/operating systems	JEVDJIC, Djordje
U0791120	Bridging the Gap Between Dialogue StateTracking and Text Summarization	KAN Min Yen
U0791130	SciWING Scholar Document Processing Platform	KAN Min Yen
U0791140	Dataset Extraction from Scientific Documents	KAN Min Yen
U045130	Genome assembly	SUNG WING KIN
U130030	Emerging Security Problems in WebAssembly and Binaries	LIANG Zhenkai
U271050	SimBricks: modular simulation framework for end-to-end network system evaluation	LI Jialin

UROP and FYP Support

Many research projects require small amounts of computational resources, hardware, software or stationery. To defray these costs, the SoC Exco has approved a budget of up to S$200 for the Undergraduate office to administer to help principal investigators claim such expenses.

The general rules are simple:

- Limited to one reimbursement request per student, up to a maximum of 5 students per supervisor.
- Expenses must be definitely related to the project, determined at the discretion of the UROP and FYP coordinators (currently, Min and Prof Zhao Shengdong).
- Multiple supervised students **can be combined** to claim for a larger expense.
- Claims to be made directly by the supervisor
- Reimbursements are on a first-come, first-serve basis only until the budget is exhausted.
- No reservations of the budget in advance by supervisors is allowed.

Feedbacks from UROP students:

What have you learned from UROP?

Taught me a great deal about research in information theory and statistics - **Nelvin Tan**

Research skills, time management, mathematical skills - **Ong Kuan Yang**

I have learnt to formulate my research topic and work towards a publication. That is beneficial if one wants to delve into academia - **Eugene Lim**

How to digest research papers, as well as write your own. Being directed to resources and possibly even experts on the topic, to increase your own expertise. Experience in submitting a paper and getting reviews in a real conference - **Lim Fong Yuan**

Feedbacks from UROP students:

Tips?

Excellent opportunity if you want if want to learn more about research or plan to do research in future - **Nelvin Tan**

Find a topic that you like - **Ong Kuan Yang**

Time and workload management is important **- Kong Zijin**

Unless you really know what you're doing, don't take any open projects, because in there, you will be calling all the shots yourself. Ask your prospective prof to send you some research papers to read, before you decide if that's a project you're into. - **Lim Fong Yuan**

Prof Trevor Erik Carlson

We have been extremely happy with the work that we have done with our UROP students. Together, I work to treat our researchers as close member of our team, and through collaboration and drive by the students, we have published papers and our work has formed the basis of new research projects. Together, we have built new AI accelerator hardware and designed new AI algorithms to improve the speed and efficiency of AI systems. Overall, I've been very impressed by the work the students can accomplish, and they have, and will continue to make an impact as a part of our research group.

Miss Ran Yiding

UROP has been a meaningful experience to me. I started knowing nothing about recommendation system, but ended up building a module recommendation system that allows for learning analytics. I did not only learn more about this area but also gained skills to conduct independent research in other field.

Module Recommendation System
Supervisor: Prof Kan Min-Yen

Mr Kyle Timothy Ng Chu

The UROP programme is an amazing opportunity for anyone interested in pursuing further studies or a career in academia. The programme gave me the chance to choose a topic that I was genuinely interested in and to study it in-depth. It also helped me to better understand the non-technical skills needed to make a good researcher such as what makes a good research paper and how to present the results of your research. During the entire course of the programme, I was given a great deal of guidance and support from not only my supervisor but also from the postdocs and phd students in the research group.

You Only Spike Once: Improving Energy-Efficient Neuromorphic Inference to ANN-Level Accuracy

Supervisor: Trevor Erik

Mr Gabriel Yeo Fang Yan

UROP was a trial for me in my personal journey that repaid itself in many ways. It renewed in me a curiosity and an appreciation for deeply theoretical work, and gave me the confidence to pursue more technical areas of computer science at a higher level. I am thankful I had the opportunity to work with Assoc. Prof. Ooi Wei Tsang, who nurtured my development and gave me direction. I highly recommend the program to students with any interest in exploring the fundamentals of computer science or those looking for a challenge.

Scheduling and Routing Algorithms for Last-Mile Delivery using Autonomous Robots
Supervisor: Dr Ooi Wei Tsang

Mr Zhang Xiaoyan

I did a recursion theory project supervised by Professor Stephan. He introduced concepts and examples, and then provided problems for me to solve. These problems with hints became gradually deeper and harder, and gave me a good experience exploring the world of logic.

Structure of 1-degree inside m-degree
Supervisor: Dr Stephan Frank

Mr Nguyen Dang Phuc Nhat

Prof Trevor's group is an ideal place to learn to do research as an undergraduate. Here, you'd have very frequent feedback and collaboration opportunities with graduate students and even more mature researchers. The best thing is that Prof has incredibly positive energy that would definitely make you feel welcome and motivated to tackle challenging research problems.

Investigation of ANN-converted Spiking Neural Networks
Supervisor: Dr Trevor Erik Carlson

Mr Ong Kuan Yang
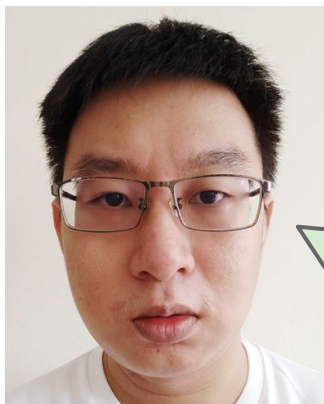
UROP was a rare opportunity for me to try my hand at independent (but guided) research at an early stage in my undergraduate studies. It allowed me to experience for myself what research can be like and it was what led to me doing a PhD after graduating.

I encourage students who are at all interested in research to try it, as there is little cost incurred but potentially huge benefits to be gained.

Inductive Inference with Severe Constrains
Supervisor: Dr Stephan Frank

Mr Quang Minh Hoàng

Although every step along the way was a trial to overcome, UROP was an enriching and transformative experience. By giving me the chance to work on cutting-edge problems, not only did UROP prepare me with ample technical knowledge in the field of machine learning, it had also helped me to obtain valuable skills such as problem formulation, problem solving and critical thinking. Most importantly, through working closely with brilliant mentors, I was able to cultivate a passion for academic research, which plays an important role in defining who I am today.

Scaling up Gaussian Process Inference for High Velocity in Big Data
Winner of Outstanding Undergraduate Researcher Prize for AY15-16
Supervisor: Dr Bryan Low

Mr Harta Wijaya

"UROP gives me the opportunity to work on an exciting cutting-edge research project. I really enjoy the meaningful experience working on the project. For those who loves challenges in doing research, UROP is the way to go."

Statistical Machine Translation
Supervisor: A/P Ng Hwee Tou

FAQ and Issues

Q: Are exchange students allowed to take part in UROP?
A: Yes, exchange students can take part in UROP. But since exchange is typically for a single semester, we encourage students to take **CP3106 Independent Project** instead. Exchange students wishing to participate in UROP will need to discuss their particular schedule with their prospective supervisor.

Q: I have successfully completed Orbital (CP2106) during summer but will only be credited this semester (Sem I of the following academic year). Can I count the 4MCs from Orbital towards the 60 MCs requirement for UROP?
A: Yes, Orbital work over the summer can be (and will be) counted towards your 60 MC requirements for UROP, as the work is done during the summer and not during Sem I.

FAQ and Issues

Q: In LumiNUS, there is a slot for UROP lectures. What is that and what happens if it conflicts with another module?
A: We sometimes have to create "dummy" modules to allow the timetabling system to mount the course. Don't worry, there are no UROP lectures. If you find that another course conflicts with it, we can manually register you for UROP (if bypassing ModReg; please approach the UROP administrator in the undergraduate office for assistance.

Q: Is UROP graded on the final report submitted to the digital library at the very end of UROP, or based on the report we hand in for examination? If the examiner asks for edits, are they compulsory and accounted in the final grade?
A: Your grade for UROP is partially based on the report that you turn in to the examiners. Unless otherwise communicated to you by your examiners or supervisor, further changes to the thesis for the archival copy in SoC's digital library are not considered for your grade.

Q:I heard that hardcopy is no longer required for the reports. Is that true?
A: Yes. The workflow for reports has been revised. Students need to distribute their report directly to the examiners in softcopy by default. If an examiner requests hardcopy, you will be required to furnish it. Reports will still need to be uploaded to LumiNUS for timestamping purposes.

Reminder

Students doing UROP will be registered as a year-long module, spread over 2 **consecutive** semesters.

- This means that UROP students cannot go for NOC or SEP, during UROP.
- Students keen on single-semester research are asked to enrol for **CP3106 Independent Project instead**.

Contact Information

http://www.comp.nus.edu.sg/undergraduates/urop_project.html

Coordinator: A/P KAN Min-Yen
<kanmy@comp.nus.edu.sg>, COM3 #02-30

Administrator: Ms Sue-Ann LOKE
<saloke@nus.edu.sg>, UG Office, COM1 #02-19

Thank you!

Reminder: Applications close **11 November 2022**