

# Warning

Make sure you are viewing the correct slide deck (**pink 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 2**, presented on **1 March 2023**, for prospective UROP students formally starting in **August 2023**.



From: [uiowa.edu](http://uiowa.edu)



From: [vumc.com](http://vumc.com)



# NUS SoC UROP Briefing

AY 2022/2023 Sem 2

Presented by Dr Zhao Jin  
Assisted by Ms Sue-Ann Loke  
(Revised 31 January 2023)

# Objective

Allows undergraduates to participate in active research and to experience first hand the challenges and exhilaration of research, discovery and invention, over **2 consecutive semesters**.

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 Units in progress/completed by the application time point.
- Minimum GPA of 3.8
- Approval of CS/IS department

# Important Notes

UROP application opens 1 semester ahead of the semester in which the students officially commence UROP.

- This means that students interested to start UROP in AY23/24 Semester 1, must register for UROP this semester.

# Important Notes

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

- This means that UROP students cannot go for NOC/SEP/ATAP during UROP.
- Students keen on single-semester research can consider enrolling for **CP3106 Independent Project instead.**

# Timelines

Activity	Deadlines
<b>1. Continuous Assessment</b>	
CA Report Submission	Wed, Week 12, Sem 1
Presentation	Reading Week, Sem 1
<b>2. Final Assessment</b>	
Final Report Submission	Wed of Week 12, Sem 2
Presentation	Reading Week, Sem 2
<b>3. Additional Submissions</b>	
<b>Feedback</b> of UROP Guidance and Evaluation	First Mon after Exams, Sem 2
<b>e-copy</b> of Final Report	

# Evaluation

## 30% Continuous Assessment (Interim Progress Report)

15% Supervisor	30% Understanding of the problem
15% Main Evaluator	40% Technical Achievement
	10% Project and Resource Management
	20% Report and Discussion

## 70% Final report & Oral Presentation

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

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 **(Sem 2 AY22/23)**

**6 March 2023**: UROP applications opens

- Submit the UROP application via the online application form [here](#).
- You will be informed via email once your application is processed.

**14 April 2023**: 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**

# UROP Projects From Last Sem: AY22/22 Sem 1

U325050	Detecting hand gestures using very low-power wireless signals	Ambuj VARSHNEY
U247060	Klaytab: Collaborative learning, development environment with peer reviews	NARAYAN, Akshay
U135590	Procedural content generation for games using machine learning techniques : 3D object generation using differentiable rendering	BHOJAN, Anand
U201020	High-performance Posit Arithmetic Library for Machine Learning	CARBUNARU, Cristina
U294030	Distributed graph algorithms	CHANG Yi-Jun
U265060	Clustering with Missing Values	CHAKRABORTY, Diptarka
U011590	Sports Analytics using Probabilistic Model Checking, Computer Vision and Machine Learning	DONG JINSONG
U096070	GoAnywhere@NUS: Human-Level Intelligent Robot Navigation	HSU, David
U317090	Exploring AI for detecting early childhood learning disabilities	Ganesh NEELAKANTA IYER
U091330	Analytical performance comparison of Byzantine agreement protocols	TAY YONG CHIANG
U159100	Cloud Computing System Design and Implementation	MA Tianbai
U230640	Out of Order Commit Processor	CARLSON , Trevor Erik

U032330	Digital Twin Development and Management	HUANG ZHIYONG
U243110	Maximizing Storage Efficiency in DNA-Based Data Storage	JEVDJIC, Djordje
U243120	Open-ended project in computer architecture/operating systems	JEVDJIC, Djordje
U0791150	Edited Media Understanding	KAN Min Yen
U036190	Interactive visual grounding of ambiguous natural language instructions	LEE WEE SUN
U271060	System Infrastructure for Future Decentralized Applications	LI Jialin
U374010	Lightweight Transformers for Video Action Recognition	SHOU Zheng
U305010	Cryptography	Prashant Nalini VASUDEVAN
U305020	Cryptography	Prashant Nalini VASUDEVAN
U341010	Studying and Improving the Communication of Branch Probabilities to the Compiler	Manuel RIGGER
U341020	Automated Testing of TeX Engines	Manuel RIGGER

# 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, Dr Zhao Jin 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

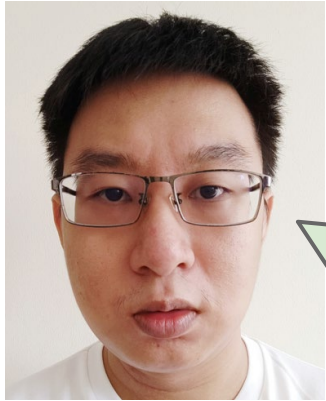
# Mr Nguyen Dang Phuc Nhat

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



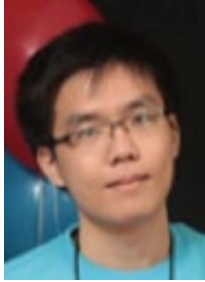
Although every step along the way was a trial to overcome, UROP was an enriching and transformative experience. By giving me the chance to work on cutting-edge problems, not only did UROP prepare me with ample technical knowledge in the field of machine learning, it had also helped me to obtain valuable 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: UROP is not open to exchange student. However, exceptions may be granted on a case-by-case basis at the discretion of the project supervisor.

*Q: I will be taking Orbital (CP2106) during summer but will only be credited next semester (Sem I of the following academic year). Can I count the 4 Units from Orbital towards the 60 Units requirement for UROP?*

A: Yes, Orbital work over the summer can be (and will be) counted towards your 60 Units requirements for UROP, as the work is done during the summer and not during Sem I.



# Contact Information

**SoC UROP Website:** [http://www.comp.nus.edu.sg/undergraduates/urop\\_project.html](http://www.comp.nus.edu.sg/undergraduates/urop_project.html)

**Coordinator:** Dr Zhao Jin  
<[zhaojin@comp.nus.edu.sg](mailto:zhaojin@comp.nus.edu.sg)>, COM2 #02-10

**Administrator:** Ms Sue-Ann LOKE  
<[saloke@nus.edu.sg](mailto:saloke@nus.edu.sg)>, UG Office, COM1 #02-19

Thank you!

Reminder: Applications close **14 April 2023**