

8 May 2022

Sankha Cooray Bulathsinhalage
154/2, Pathangiwatta, Morontuduwa, Sri Lanka

Dear Sankha Cooray Bulathsinhalage

INVITATION LETTER FOR RESEARCH ATTACHMENT

I am pleased to extend to you an invitation for a research attachment with our Department of Information Systems and Analytics, School of Computing at the National University of Singapore ("NUS"), to be hosted by A/Prof Suranga Chandima Nanayakkara.

The research attachment shall be for a period of 7 months and scheduled to take place from June 2022 to December 2022, subject to any change in the commencement date.

Details of the expected activities during your research attachment are set out in the attached Annex A.

By accepting this invitation, you understand, acknowledge and agree that:

1. (a) In the course of your research attachment, NUS' Confidential Information (as defined below) may be disclosed to you in tangible, oral or visual form and identified as confidential or proprietary or with words of similar import, or through observations made by you through your access to NUS' premises during your research attachment. You agree (i) to hold in the strictest confidence and not disclose to any third party, whether directly or indirectly, such Confidential Information, (ii) not to remove any document, diskettes, tapes, equipment or other materials containing or referring to such Confidential Information from NUS' premises, and (iii) not to copy or reproduce or permit others to copy or reproduce, in or by any form, media or device, any documents, diskettes, tapes or other materials containing or referring to such Confidential Information, without NUS' prior written permission. You shall also return immediately to NUS upon our request all documents, diskettes, tapes and other materials held by you containing or referring to Confidential Information.

(b) Your obligations to maintain confidentiality and secrecy shall apply during and after your research attachment until such time that the Confidential Information has been made public by NUS.

(c) "Confidential Information" means all information (whether recorded or not and in whatever form or media) which are not available to the public, relating to all or any part of the business, property, assets, technology, activities, services, financial affairs, management and administration of NUS, including information relating to NUS' staff, students, donors, alumni, business or academic partners, clients, suppliers and any third party dealing with NUS.
2. You will be subject to the terms set out in the attached Annex B relating to obligations under the Personal Data Protection Act 2012.
3. For purposes of determining the rights in respect of intellectual property created by you in the course of your research attachment, NUS' Policies Relating to University Intellectual

Property ("**NUS IP Policy**"), updated from time to time, shall apply to you as if you are a University Member (as defined in the NUS IP Policy, 010109 v110309) and shall take precedence over any inconsistent obligations you may have to your employee in respect of such rights.

4. During your research attachment, you will be expected to conform to all applicable NUS policies, rules and regulations as may be conveyed to you by your supervisor and/or other NUS staff from time to time.

You will be expected to provide your own funding to cover all expenses of your research attachment at NUS, including insurance to cover medical, personal accidents, loss and/or damage to personal effects and any other contingencies. Any travel, accommodation and other expenses incurred shall be borne by you. You are required to have a medical insurance with 24-hour worldwide coverage before starting your research attachment.

5. NUS may terminate the research attachment with immediate notice and without payment of any compensation should you:
 - (a) be charged with or convicted by a court of law of any crime which in NUS' opinion is likely to bring NUS into disrepute; or
 - (b) in NUS' opinion, be guilty of insobriety or misconduct or gross impropriety; or
 - (c) fail to observe any of the terms and conditions of this invitation.
6. You are solely and personally responsible for, and undertake to settle prior to leaving Singapore, all personal debts and liabilities incurred during or as a result of your visit, including but not limited to any income and other personal taxes that may be payable to the Inland Revenue Authority of Singapore ("IRAS") and other personal expenses that you may have incurred in relation to your stay in Singapore. You shall also return to NUS any laptops or other equipment, security cards, keys and other items that were loaned to you by NUS during your visit.
7. This invitation shall be governed by and construed in accordance with the laws of Singapore.
8. This invitation is contingent upon you being granted a training employment pass by the Ministry of Manpower, Singapore.

If you accept this invitation, please sign and date your acceptance on the duplicate copy of this letter and return the same to:

NUS School of Computing
COM 1, 13 Computing Drive
Singapore 117417
Attention:

Thank you.

Yours sincerely




Caslyn Wong (Ms)
Assistant Senior Manager
Research Office
School of Computing

cc: A/Prof Suranga Chandima Nanayakkara

Acceptance

I acknowledge and accept NUS' invitation on the terms and conditions as stated in the above-written letter dated 8 May 2022.

Signature	:	 _____
Full Name	:	<u>Bulathsinhalage Sankha Cooray</u>
Passport No.	:	<u>N7418830</u>
Date	:	<u>13-05-2022</u>

Project Abstract

Background

We aim to improve how students experience science by creating a sustained engagement among students to conduct curiosity-driven explorations beyond the classroom: This is a critical ingredient for effective learning. For this, we aim to leverage Augmented Reality (AR) and gamification to develop a mobile platform --DiscovAR. For example, virtual AR characters that react to the sensor input "Help Mr Worm find the wettest part of the garden" would motivate the learning in ways that are difficult with 2D interfaces.

DiscovAR will provide unparalleled opportunities, including:

- Vivid AR-enabled 3D visual experiences coupled with gamification rewards and leaderboards designed to motivate students and sustain engagement.
- Valuable and contextually relevant learning experience by drawing a direct link between the immediate physical environment and real-time sensor measurements.
- With visually-rich content, diverse learners will be supported to engage creatively and collaboratively while doing science.

We aim to engage with all stakeholders (students, teachers, and parents) in an iterative development process to make sure that their needs, interests, and considerations are integrated into the DiscovAR.

Development Plan

We will iteratively develop the platform to ensure optimal usability and user experience. This includes:

- Brainstorming sessions
- Low fidelity prototypes with pen & paper
- Mid fidelity prototypes with tools such as power point, Invision, Figma
- High fidelity prototype on iOS and Android using cross platform app development tools

We will also embed data collection strategies:

- Usage data from server logs
- Intrinsic Motivation Inventory questionnaire
- Open ended user feedback

Research Aim

Motivation is a critical ingredient for effective learning, as motivated students demonstrate greater persistence and engagement in academic tasks and therefore achieve better long-term outcomes. The DiscovAR platform is aimed to motivate and encourage hands-on learning experiences in students' science inquiries without specific restrictions on the time and place for such investigations. For example, a student could measure air quality anytime during the day without having to borrow a kit from the school's science lab and being further restricted by having to use it during a specific time of the day. There will also be opportunities to gamify and create enticing challenges to further engage students and sustain their interests.

The DiscovAR platform will also bring unique opportunities to teachers. For example, students will have the chance to upload some of their explorations on DiscovAR into the existing learning platforms used

in schools (e.g. Google Classroom) to share their findings with other students and teachers, fostering discussions and peer support, validation, and encouragement.

We also envision that the future development of DiscovAR has the potential to conduct collaborative explorations across the globe. For example, 2 students in New Zealand and Singapore could investigate the differences between air qualities of the two places simultaneously in a virtual lab space. This could lead to child-led citizen science in the community.

During this research, we will summarize current research result through literature review and develop a prototype.

Training Schedule

June 2022	- Literature review and discuss
July 2022	- Literature review and discuss
August 2022	- Literature review and discuss, Development of the initial prototype
September 2022	- Development of the initial prototype
October 2022	- Development of the initial prototype, Iterations to the prototype
November 2022	- Iterations to the prototype, Discuss of the result and further suggestion
December 2022	- Discuss of the result and further suggestion

Annex B

1. In connection with the Personal Data Protection Act 2012, I agree to my personal data (that is in the possession of NUS and that I may provide NUS in the future) being collected, used and disclosed by NUS for the purposes of:
 - (a) processing, administering, managing and/or terminating my relationship with NUS and such ancillary matters relating to my health, general well-being and welfare;
 - (b) facilitating communication with me or my nominated contacts in an emergency;
 - (c) managing NUS' infrastructure and operations, including disclosure and processing necessary for NUS to conduct its activities, including but not limited to responding to third party requests pursuant to contractual requirement and engaging of outsourcing companies;
 - (d) maintaining campus safety and security of persons and property (including the use of CCTVs), as well as investigating any alleged or actual fraud, misconduct or unlawful conduct within NUS;
 - (e) carrying out due diligence or other monitoring or screening activities (including background checks) in accordance with legal or regulatory obligations or risk management procedures that may be required by law or that may have been put in place by NUS;
 - (f) complying with legal or regulatory obligations or NUS' internal policies and procedures (including regulatory reporting in accordance with statutory obligations that may be required by law), as well as responding to requests for information from Ministries, public agencies, statutory boards or other similar authorities from time to time;
 - (g) responding to legal process, pursuing legal rights and remedies, defending litigation and managing complaints or claims;
 - (h) storage, hosting, back-up and disaster recovery;
 - (i) carrying out and performing NUS' obligations in its contracts with current / potential partners and/or other third parties, which may require exchange of personal information of staff with such counter-parties;
 - (j) administrative purposes including, without limitation, processing, facilitating and making arrangements for business travels, and managing and administering the security control and access rights to NUS' premises;
 - (k) managing, facilitating and administering activities that are conducted or offered by NUS and/or external entities which may include the disclosure of my information to NUS' Development Office, other NUS units and/or such external entities for the participation in social and welfare programmes, donation and/or other charity activities;

- (l) taking of photographs and/or videos (whether by NUS staff or third party photographers and/or videographers) during events or seminars organised by NUS or its affiliates for publicity purposes (including in NUS' publicity and communications materials); and
 - (m) disclosing and transferring data to any third party service providers, agencies (which may be sited out of Singapore) that provides administrative, data processing, computer or other services to NUS.
2. I understand and acknowledge that my personal data will/may be disclosed by NUS to third party service providers or agents (whether in Singapore or elsewhere in the world where such service providers are sited) for one or more of the abovementioned purposes, as such third party service providers or agents, if engaged by NUS, would be processing my personal data for NUS, for one or more of the abovementioned purposes.
3. I further understand and acknowledge that NUS may retain my personal data upon termination of my relationship with NUS for any residual activities (for e.g., the provision of references, record keeping purposes, and allowing NUS to fulfil any of its contractual or statutory obligations).
4. I consent to the collection, use and disclosure of my personal data for the above purposes and I will ensure that my personal data is correct and true by keeping my personal information as declared by me to NUS up to date at all times.
5. I further declare and warrant the following:
- (a) that for any personal data of any other individuals disclosed by me in connection with processing, administering, managing and/or terminating my relationship with NUS and ancillary matters relating to my general well-being and welfare, prior to disclosing such individuals' personal data to NUS, I have obtained the appropriate consent from the individuals whose personal data are being disclosed, to permit NUS to collect, use and disclose such personal data for the purposes related thereto;
 - (b) that the personal data of the other individuals above that I will be or is disclosing to NUS are accurate. Further, I shall give NUS notice in writing as soon as reasonably practicable should I be aware that any such personal data has been updated and/or changed after such disclosure, or that any individual above has withdrawn such consent as set out in clause 5(a); and
 - (c) that for any data that I collect or have access to in the course of my work, I would use and disclose the information in compliance with the obligations under the Personal Data Protection Act and other confidentiality requirements imposed on me
6. I understand and acknowledge that the terms set out in this statement shall be incorporated by reference to and form part of the terms of NUS' offer of training to me.