

Samantha W. T. Chan

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Overview

I am a Human-Computer Interaction researcher. I explore and create technologies which extend human memory and cognition through mobile, wearable, affective and cognition-aware computing. I am effective at researching and implementing interactions beyond laboratory settings to make a meaningful impact on people through my skills in design, prototyping, multi-modal sensing and processing, and machine learning.

Education

Ph.D., Human-Computer Interaction

University of Auckland (UoA), New Zealand

Augmented Human Lab. Supervisors: Suranga Nanayakkara, Haimo Zhang and Lynette Tippett.

Mar 2018 to Present

Thesis: Exploring just-in-time memory training and assistance for older adults through detection of physiological signals (biosignals) to infer users' intentions and cognitive-affective contexts.

B.Eng., Engineering Product Development

Singapore University of Technology and Design (SUTD), Singapore

Summa Cum Laude (1st Class Honours). Specialisation: Electrical Engineering.

May 2013 to Sep 2016

Summer Student, Industrial Design

Zhejiang University, China

May 2014 to Aug 2014

Selected Research Projects

MemoryEmotionVR

Project Collaborator with Empathic Computing Lab

- Conducted study to collect biosignals of heart-rate variability, skin conductance, brain signals (EEG) and eye-movements while users recalled emotional autobiographical memories in virtual reality (VR) environments.
- Analysing data (from ShimmerGSR, OpenBCI, and HTC Vive Pro Eye) and building machine learning model to detect emotional recall for adaptive VR applications.

Aug 2020 to Present

Using Voices of Friends and Relatives in Voice Interfaces

Project Lead

- Conducted user studies to design guidelines and understand user perceptions on voice interfaces which use the voices of friends and relatives.
- Deployed voice-cloning machine learning model on Google Cloud within a Django API (Python) and developed interface to set and receive reminders in cloned-voices on Amazon Echo Dot.

Mar 2020 to Sep 2020

Prospero: Mobile and Wearable Memory Coach [↗](#)

Project Lead

- Implemented chat-based Android/iOS applications that use biosignals of heart-rate variability and skin conductance to detect calmness (low stress) for opportunistic memory training.
- Conducted lab and field study with older adults, quantitative analysis of biosignals (from E4 wristband) and questionnaires, and qualitative analysis of interviews.
- Published work showed increased receptivity to memory training during calm states [6,9].

Jan 2019 to Sep 2019

fSense: Force Detection via Smartwatch Heart-Rate Sensor [↗](#)

Project Collaborator

- Held user study for data collection using heart-rate sensor in Samsung Gear 3 smartwatch to develop classifier for force levels exerted during gestures and grasps [4].

Apr 2018 to Jul 2018

ProspecFit: Memory Training Technique on Mobile Application [↗](#)

Project Lead

- Developed Android application to facilitate an effective memory training technique.
- Ran field study and usability testing with older adults, quantitative analysis using R, and qualitative analysis of interviews and diaries.
- Users showed improvements in memory tasks and work was published in a journal [7].

Mar 2018 to Dec 2018

Understanding Cognitive-Affective States in Kindergarteners [↗](#)

Jul 2017 to Nov 2017

Project Collaborator

- Implemented facial expression analysis using Microsoft Face Emotion API to assist in forming a framework to understand kindergarteners' cognitive-affective states [3,5].

Experience

Creative Technologist, UoA

Jan 2019 to Nov 2019

Unleash Space - Makerspace, Centre for Innovation and Entrepreneurship

- Conducted training for fabrication equipment use (laser-cutters, 3D-printers, CNC machines).
- Assisted and advised students on developing their creative and entrepreneurial projects.
- Facilitated workshops on topics including Arduino, Makey-Makey robots, AR/VR in Unity.

Researcher - Robotics, SUTD-MIT International Design Centre

May 2015 to Aug 2016

Undergraduate Research Opportunities Programme

- Developed mobile wireless control for amphibious rolling robot via MIT AppInventor and Arduino.
- Designed flexible 3D-printed sleeve in Solidworks to enhance robot's land and water movement.
- Work resulted in a publication [1], was demoed in Europe Maker Faire '15 and featured on Discovery Channel Canada.

Researcher - Participatory Action Research, SUTD

Jan 2015 to Apr 2016

Ho Chi Minh Community Design Project - Vietnam

- Conducted community design workshops, feedback and interviews with residents of Phu Xuan.
- Co-designed and built community space including a bamboo playground with residents, project team and students from local Vietnamese universities.
- Project resulted in a design report booklet and received the **SUTD Humanitarian Award**.

Industrial Design Intern, Chemtax, Orient Befit and Zhejiang University

May 2014 to Aug 2014

Asian Leadership Programme - Hangzhou, China

- Designed compression sportswear prototype, which could enhance runners' performance and blood circulation, using Adobe Illustrator and Rhinoceros 3D software.
- Wearable prototypes were exhibited in Zhejiang University in '14, SUTD in '14 and '15.

Researcher - Additive Manufacturing, SUTD-MIT International Design Centre

Sep 2013 to Jul 2015

Undergraduate Research Opportunities Programme

- Built and analysed open-source 3D printer designs to develop reliable and low-cost designs.
- Developed two prototypes based on findings which were demoed in Singapore Maker Faire '15.

Awards and Honours

Gold Pin Award, Student Digital Category

2020

In recognition of project *Prospero* by Designers Institute of New Zealand as the best in category.

Honorable Mention, Fast Company World Changing Ideas Award, Student Category

2020

In recognition of project *Prospero*.

Female Founders Prize by UniServices

2019

In recognition of project *Prospero* for excellent venture idea at UoA Velocity Innovation Challenge.

Auckland Bioengineering Institute Doctoral Scholarship

2018

Full-scholarship with stipend awarded by UoA to pursue doctoral studies.

SUTD President's Graduate Fellowship

2017

Full-scholarship with stipend awarded by SUTD to pursue doctoral studies.

SUTD Humanitarian Award

2016

Awarded for outstanding humanitarian work in *Ho Chi Minh Community Design Project*.

Habitat for Humanity Dedicated Service Award

2015

Awarded by Habitat for Humanity Singapore for service as *Treasurer* of its SUTD Campus Chapter.

Peer-Reviewed Publications

- [9] **Chan, S. W. T.**, Sapkota, S., Mathews, R., Zhang, H. and Nanayakkara, S. 2020. Prompto: Investigating Receptivity to Prompts Based on Cognitive Load from Memory Training Conversational Agent. In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 4, 4, Article 121 (December 2020), 23 pages. <https://doi.org/10.1145/3432190>.
- [8] **Chan, S. W. T.** 2020. Biosignal-Sensitive Memory Improvement and Support Systems. In Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (CHI EA '20). ACM, New York, NY, USA, 1–7. <https://doi.org/10.1145/3334480.3375031>.
- [7] **Chan, S. W. T.**, Buddhika, T., Zhang, H., Nanayakkara, S. 2019. ProspecFit: In Situ Evaluation of Digital Prospective Memory Training for Older Adults. In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 3, 3, Article 77 (September 2019), 20 pages. <https://doi.org/10.1145/3351235>
- [6] **Chan, S. W. T.**, Zhang, H., Nanayakkara, S. 2019. Prospero: A Personal Wearable Memory Coach. In Proceedings of Augmented Human International Conference 2019 (AH '19), March 11–12, 2019, Reims, France. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3311823.3311870>.
- [5] Sridhar, P. K., **Chan, S. W. T.**, Chua, Y., Quin, Y. W., Nanayakkara, S. 2019. Going beyond performance scores: Understanding cognitive-affective states in Kindergarteners and application of framework in classrooms. International Journal of Child-Computer Interaction (IJCCI), Volume 21, 2019, Pages 37-53, ISSN 2212-8689. <https://doi.org/10.1016/j.ijcci.2019.04.002>
- [4] Buddhika, T., Zhang, H., **Chan, S. W. T.**, Dissanayake, V., Nanayakkara, S., Zimmermann, R. 2019. fSense: Unlocking the Dimension of Force for Gestural Interactions using Smartwatch PPG Sensor. In Proceedings of Augmented Human International Conference 2019 (AH '19), March 11–12, 2019, Reims, France. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3311823.3311839>
- [3] Sridhar, P.K., **Chan, S. W. T.**, Nanayakkara, S. 2018. Going beyond performance scores: understanding cognitive-affective states in kindergarteners. In Proceedings of the ACM Conference on Interaction Design and Children (IDC '18). ACM, New York, NY, USA, 253-265. <https://doi.org/10.1145/3202185.3202739>
- [2] Elvitigala, D. S., **Chan, S. W. T.**, Howell, N., Matthies, D. J. C., Nanayakkara, S. 2018. Doodle Daydream: An Interactive Display to Support Playful and Creative Interactions Between Co-workers. In Proceedings of the Symposium on Spatial User Interaction (SUI '18). ACM, New York, NY, USA, 186-186. <https://doi.org/10.1145/3267782.3274681>
- [1] Satria, S., Lee, J. W., **Chan, S. W. T.** 2015. Portable Amphibious Spherical Rolling Robot with Live-Streaming Capability for Ground and Aquatic Deployment. IRC Conference on Science, Engineering and Technology (13 May 2015, National University of Singapore, Singapore). <http://ircset.org/main/conference-2015/downloadss4/>

Academic and Leadership Service

Organising Committee, Virtual Conference Co-chair

ACM International Conference on Mobile Human-Computer Interaction MobileHCI 2021

Organising Committee, Student Volunteer Co-chair

ACM International Conference on Mobile Human-Computer Interaction MobileHCI 2022 (To start)

Reviewer

CSCW 2021, HRI 2021, CHI 2021, ETRA 2021, MobileHCI 2021

Student Volunteer

MobileHCI 2020, CHI 2021

Vice-President (Founding Member), Executive Committee, UoA

Led pioneering team to establish the Engineering Postgraduate Students Association.

May 2019 to Present

Delegate, United Nations, University Scholars Leadership Symposium, Bangkok

Humanitarian Affairs Asia and United Nations Development Programme

Aug 2017

Treasurer (Founding Member), Executive Committee, SUTD

Established Habitat for Humanity Singapore Student Campus Chapter. **Dedicated service award.**

Sep 2013 to Aug 2016

Teaching Experience

Graduate Teaching Assistant , Creative Arts and Industries, UoA Design and Assistive Technologies (DESIGN 243). Co-developed curriculum. Lectured on Memory and Learning.	Jun to Nov 2020
Graduate Teaching Assistant , Creative Arts and Industries, UoA Design Methods and Processes (DESIGN 100). Assisted instructor during classes. Advised students.	Mar to Jun 2020
Graduate Teaching Assistant , Chemical and Materials Engineering, UoA Applied Chemistry: Conductive Polymers (CHEMMAT 206). Facilitated lab sessions. Marked reports.	Mar to Jul 2019
Graduate Teaching Assistant , Engineering Product Development, SUTD Systems and Control (30.101). Assisted instructors during tutorials. Advised students.	Jan to Apr 2017
Teaching Assistant , SUTD Chemistry: From Atoms To Crystals (10.003). Co-developed curriculum, question sets and teaching materials for supplementary classes. Tutored peers.	May to Aug 2013

Students Mentored

Tamil Selvan , Masters, Empathic Computing Lab, UoA	2020
Jovana Lazarevic , Undergraduate, University of Novi Sad	2020
Rebecca Matthews , Undergraduate, Manipal Institute of Technology (Now Masters at University College Dublin)	2019
Shardul Sapkota , Undergraduate, Yale-NUS College (Now at Shopee)	2019
Adrian Robertson , Undergraduate, Carleton University	2018

Skills and Tools

Programming: Python, Java, JavaScript, R, C/C++, C#
Prototyping and Research Analysis: MATLAB, Unity, Arduino, NVivo, SPSS
Machine Learning: Scikit-learn, TensorFlow, PyTorch, WEKA
Design: SolidWorks, Rhino, Fusion 360, Adobe Creative Suite (Photoshop, Illustrator, Premiere Pro, After Effects)
Bassist, Ukulelist and Guitarist: Performed with Delta Infinity SUTD Band '13 to '16 and for 10+ external events
Film-Maker: Made seven short-films. Received three awards.

References

Dr. Suranga Nanayakkara
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University of Auckland
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Dr. Haimo Zhang
HCI Research Lead
OPPO Research Institute
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Dr. Joel Yang
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