Dr. Brandon Victor Syiem

School of Computer Science, The University of Sydney, NSW, 2006
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Education

Ph.D in Human Computer Interaction Melbourne, Australia
The University of Melbourne February 2019 - April 2023

- Thesis title: "Attentional Reality: Understanding and Designing for Limited Attentional Capacity in Augmented Reality"
- Supervisors: Prof. Eduardo Velloso, A/Prof. Jorge Goncalves and A/Prof. Tilman Dingler.

Master of Science (Computer Science) Melbourne, Australia
The University of Melbourne February 2016 - December 2017

- Weighted Average Mark: 85.75 (with Distinction)
- Thesis Title: "Gaze-supported Selection and Annotation for Holographic Interaction"
- Supervisor: Prof. Eduardo Velloso

Bachelor of Technology (Information Technology) Shillong, India
North Eastern Hill University August 2010 - July 2014

- Weighted Average Mark: 78.9 (First Class Honours)
- First Final Year Project Title: "Student Information Management System"
- Second Final Year Project Title: "Popularity Analysis on Social Network using MapReduce"
- Supervisor: Dr. Sufal Das

Professional Experience

Postdoctoral Research Associate Sydney, Australia
The University of Sydney May 2024 - Current

- Distributed Collaboration in Mixed Reality: Lead, supervise and support research in designing and developing collaborative mixed reality systems to enhance diverse work practices .
- Supervisor: Prof. Eduardo Velloso

Postdoctoral Fellow Brisbane, Australia
Queensland University of Technology January 2023 - April 2024

- Scientific Workflows in Immersive Systems: understand and leverage the affordances of extended reality systems in aiding scientific analysis of remote sensing data.
- Supervisor: A/Prof. Selen Türkay

Research Fellow Melbourne, Australia
The University of Melbourne August 2022 - November 2022

- Future of Work Project: design and execute experiments around the use of causal models to address problems related to the future of work.
- Supervisor: Prof. Frank Vetere

Research Assistant Melbourne, Australia
The University of Melbourne March 2022 - December 2022
- Design, development and evaluation of a social augmented reality experience at the zoo using Snap Spectacles.

Academic Tutor Brisbane and Melbourne, Australia
Queensland University of Technology March 2023 - June 2023
- Teaching: Design and Development of Immersive Environments (IGB388)

The University of Melbourne February - July 2019, 2020, 2022
- Teaching: Designing Novel Interactions (INFO90003) and Media Computation (COMP10003)

Residential Leader/Tutor Melbourne, Australia
International House, The University of Melbourne February 2019 - May 2021
- Teaching: Foundations of Computing (COMP10001), Foundations of Algorithms (COMP10002) and Algorithms & Data Structures (COMP20003).
- Pastoral care support for students residing at the International House residential college.

Software Developer Shillong, India
National Informatics Centre 2015 & 2018
- Gazetted Entitlement Management Project: Full stack development using JSP, Postgresql and JQuery. (Jun 2018 - Dec 2018)
- Land Registration Project: Full stack development using Java Spring, Spring Security and Hibernate. (Jul 2015 - Nov 2015)

Lecturer Shillong, India
North Eastern Hill University February 2018 - May 2018
- Subject coordinator: Artificial Intelligence
- Subject co-coordinator: Computer System Programming
- Teaching: Artificial Intelligence and Computer System Programming

Computer Support and Lab Administrator Melbourne, Australia
International House, The University of Melbourne February 2017 - December 2017
- Configuration and Maintenance of Laboratory Computers and Servers.
- Maintenance of networking infrastructure.

Select Research Projects

Enhancing Remote Mixed Reality Collaborations through Intelligently Blended Spaces
- In this project , we employ state-of-the-art computer vision techniques to create 3D reconstructions of physical environments that enable interactive object segmentation in mixed reality. Future work aims to enable meaningful shared references in remote mixed reality collaborations by employing intelligent blending of distributed physical spaces that have been reconstructed and segmented.
- Contribution: I am co-supervising a PhD student focusing on the project. I am also actively applying for grants related to this project with external partners.

Collaborative Scientific Workflows in Immersive Systems

- In this project, we design, develop and evaluate immersive applications to support sense-making tasks in STEM. Specifically, we explore the spatial, collaborative and adaptive capabilities of immersive systems in enabling analytical workflows and communication paradigms currently unavailable to non-immersive alternatives..
- Contribution: I led and collaborated with other researchers on multiple projects that explore applications in virtual reality, augmented reality and augmented virtuality to achieve the core objectives of the project. Resulting papers include; 1) a publication in Behaviour & Information Technology, 2) a full research article currently under review at IJHCS.

Copresence in Telepresence

- In this project, we explore the effects of a volumetric capture-based telepresence system on remote collaborative tasks. We will compare the effects of our volumetric capture-based telepresence system on copresence against current state-of-art systems (immersive and non-immersive).
- Contributions: I collaborated on the experimental design and in writing the paper. The resulting paper from this study has been accepted at CHI, 2024.

Snap Creative Challenge: Social Augmented Reality

- In this project, we investigate how AR can be meaningfully integrated to enhance the Zoo experience for visitors.. This project is funded by Snap Inc.
- Contributions: I lead a study to explore the design space of AR applications based on different animal exhibits (walk through, glass enclosure, etc.), animal behaviours (active, shy, etc.) and visitor density. The resulting paper from this study has been accepted at CHI, 2024.

Optimal Stimuli in Augmented Reality

- In this project, we explore repetitive visual stimuli with varying frequencies in augmented reality to determine stimuli that can be optimally detected through electroencephalographic (EEG) signals.
- Contributions: Collaborating on the design of data collection procedures, developing a part of the experimental system and co-authoring the resulting paper, which has been published at IEEE Access.
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Temporal Target Selection in Virtual Reality

- In this project, we present models that predict when a user performs a selection input and their selection error for tasks that require users to trigger the input within a bounded time window, with a selection cursor that is expected to be delayed. We evaluate the proposed models in a user experiment.
- Contributions: Collaborating in the development of the temporal target selection model and redrafting the resulting paper, which has been published at CHI, 2023.

Reflected Reality: Blending Head-mounted and Mirror-based Augmented Reality

- In this project, we design and develop an augmented reality system that expands the augmented space across a smart mirror. The system enables novel interactions that blend the physical space and its reflection. We evaluate the user experience of interacting with the experimental system.
- Contributions: Collaborating in the design of the system, developing a portion of the proposed system and co-authoring the resulting paper, which has been accepted at IMWUT.

Adaptive Systems for Mitigating Attentional Issues in Augmented Reality

- In this project, we explore the challenges faced by users in interacting with an intelligent adaptive agent designed to reduce attentional issues associated with tasks performed in augmented reality. The agent observes and responds to user behaviours (gaze and interactions) to reduce attentional cost incurred by digital content in AR when the user is engaged with a task. We evaluate how the use of the adaptive agent affects user experience and performance.
- Contributions: I was the lead researcher responsible for designing and conducting the experiment. I developed the agent and the AR application used in the experiment. I was responsible for writing the resulting paper, which is published in IJHCS.

Impact of Task on Attentional Tunneling in Handheld Augmented Reality

- In this project, we investigate how tasks associated with digital content presented in augmented reality applications affect the attentional tunneling phenomenon. This project consists of controlled experiments designed to understand the demand for attentional resources imposed by task-related digital content in AR.
- Contributions: I was the lead researcher responsible for designing and conducting the experiment. I was responsible for writing the resulting paper, which won a Best Paper Award at CHI, 2021.

Evaluating Rewild Our Planet: A Shared Augmented Reality Experience

- In this project, we explore the effects of using augmented reality in settings with multiple sources of information. The project focuses on user attention allocation in an AR-supported installation (Rewild Our Planet) presenting information on the AR device, projected display and human docent. Rewild Our Planet was designed by PHORIA in collaboration with partners, such as Google, World Wildlife Fund and Netflix.
- Contributions: I was the lead researcher responsible for data collection, data analysis and writing the resulting paper, which was published at ISMAR, 2020.

Publications

I have included relevant quality indicators for each venue in the form of CORE Conference Rankings and SCIMAGO Journal Rankings.

- CORE Conference Rankings provides an assessment of major conferences in the computing disciplines. Conferences are categorized as A* (Best), A, B, C, and Australasian B and C (primary audience: Australia and New Zealand).
- SCIMAGO Journal Rankings provides an assessment for all journals worldwide. Journals are ranked from Q1 (Best) to Q4 .

Published/Accepted

- Syiem, B. V., Türkay, S. A Systematic Exploration of Collaborative Immersive Systems for Sense-Making in STEM. Journal of *Behaviour & Information Technology (**BIT**), 2024*. https://doi.org/10.1080/0144929X.2024.2441963. **SCIMAGO = Q1.**
- Syiem, B. V., Kelly, R. M., Dingler, T., Goncalves, J., & Velloso, E. Challenges in Adaptive Systems for Mitigating Attentional Issues in Augmented Reality. *International Journal of Human-Computer Studies (**IJHCS**), 2023.* https://doi.org/10.1016/j.ijhcs.2024.103324. **SCIMAGO = Q1.**

- Syiem, B. V., Webber, S. Kelly, R.M., Zhou, Q., Goncalves, J., Velloso, E. Augmented Reality at Zoo Exhibits: A Design Framework for Enhancing the Zoo Experience. ***CHI***, 2024. https://doi.org/10.1145/3613904.3642015**. CORE A*.**
- Irlitti, A, Latifoglu, M., Hoang, T., Syiem, B.V., Vetere F. Volumetric Hybrid Workspaces: Interactions with Objects in Remote and Co-located Telepresence. ***CHI***, 2024. https://doi.org/10.1145/3613904.3642814. **CORE A*.**
- Zhou, Q., Syiem, B. V., Goncalves, J., & Velloso, E. Reflected Reality: Augmented Reality through the Looking Glass. Journal of *Interactive, Mobile, Wearable and Ubiquitous Technologies* (***IMWUT***), 2023. https://doi.org/10.1145/3631431**. SCIMAGO = Q1.**
- Khorasani, Syiem, B. V., S., Nawaz, S., Knibbe, J., Velloso, E. An Empirical Evaluation of Educational Data Mining Techniques in Dynamic VR Applications. ***OzCHI** 2023.* **CORE Australasian B.**
- Khorasani, S., Syiem, B. V., Nawaz, S., Knibbe, J., Velloso, E. Hands-on or Hands-off: Deciphering the Impact of Interactivity on Embodied Learning in VR. ***Computers & Education: X Reality.*** **SCIMAGO = Unranked.**
- Zehra, S.R., Mu, J., Syiem, B. V., Burkitt, A.N., Grayden, D. B. Evaluation of optimal stimuli for SSVEP-based augmented reality brain-computer interfaces. ***IEEE Access**, 2023.* **SCIMAGO = Q1.**
- Yu, D., Syiem, B. V., Irlitti, A., Dingler, T., Velloso, E., & Goncalves, J. (April 2023). Modeling Temporal Target Selection: A Perspective from Its Spatial Correspondence. In *Proceedings of the 2023 ACM CHI Conference on Human Factors in Computing Systems (**CHI**)* (pp. 1 - 14). https://doi.org/10.1145/3544548.3581011. **CORE A*.**
- Wright, C., Syiem, B., Kelly, J., Campbell, K., & Hamilton, K. (2022). Nutrition information sought on a bariatric surgery online forum. ***Nutrition and Dietetics**, 79*(S1). **SCIMAGO = Q2.**
- Syiem, B. V., Kelly, R. M., Goncalves, J., Velloso, E., & Dingler, T. (2021, May). Impact of Task on Attentional Tunneling in Handheld Augmented Reality. In *Proceedings of the 2021 ACM CHI Conference on Human Factors in Computing Systems (**CHI**)* (pp. 1-14). https://doi.org/10.1145/3411764.3445580. **Best Paper Award. CORE A*.**
- Syiem, B. V., Kelly, R. M., Velloso, E., Goncalves, J., & Dingler, T. (2020, November). Enhancing Visitor Experience or Hindering Docent Roles: Attentional Issues in Augmented Reality Supported Installations. In *2020 IEEE International Symposium on Mixed and Augmented Reality (**ISMAR**)* (pp. 279-288). IEEE. https://doi.org/10.1109/ISMAR50242.2020.00053. **CORE A*.**
- Das, S., Syiem, B. V., & Kalita, H. K. (2014). Popularity analysis on social network: a big data analysis. *International Journal of Computer Applications (**IJCA**), 975*, 27-31. **SCIMAGO = Q4.**

Articles Under Review

- Yu, W., Chen, G., Bai, Z., Wang, X., Syiem, B.V., Velloso, E. Seg2Collab: Interactive 3D Segmentation System for Mixed Reality Collaboration. Under Review at the *ACM Symposium on User Interface Software and Technology (**UIST**).* **CORE A*.**
- Syiem, B. V., Türkay, S., Gallagher, C., Schrank, C. From Surface to Space: Investigating 2D and 3D Drawing for Supporting Spatial Dialogue in VR. Under Review at the *International Journal of Human-Computer Studies (**IJHCS**).* **SCIMAGO = Q1.**
- Li, T., Syiem, B.V., Van Berkel, N., Withana, A., Sarsenbayeva, Z. Trends and Directions of Extended Reality Research in HCI: A Co-Word Analysis. Venue to be decided.
- Grønbæk, JE., Genay, A., Irlitti, A., Syiem, B.V., Knibbe, J., Wong, E., Li, T., Bai, Z., Velloso, E. Distributed Mixed Reality Collaboration: From Vision to Mission. Venue to be decided.

Awards

- **Best Paper Award** - CHI 2021 (Awarded to top 1% of 2844 submissions).
- Awarded with the **Melbourne Research Scholarship.**
- **Top graduates (3rd ranked in the state)** for the Bachelor of Technology (Information Technology) Course.
- Awarded **1st place** in the Zonal Round of IURL:Indo-US robo league held in North-Eastern Hill University, India in April 2013.
- Awarded **2nd place** in the CodeWars competition during the 'Anakalypsi' Tech Fest held in North-Eastern Hill University, India 2011.

Reviewing Experience

- Human Factors in Computing Systems (**CHI**)
    - Special Recognitions
    - Associate Chair (2024)
- Interactive, Mobile, Wearable and Ubiquitous Technologies (**IMWUT**)
- Computer-Human Interaction in Play (**CHI PLAY**)
- Australian Conference on Computer-Human Interaction (**OzCHI**)
- Designing Interactive Systems (**DIS**)
- Interactive Surfaces and Spaces (**ISS**)
- International Symposium on Mixed and Augmented Reality (**ISMAR**)
- International Symposium on Wearable Computers (**ISWC**)
- Australasian Joint Conference on Artificial Intelligence (**AJCAI**)
- International Journal of Human-Computer Studies (**IJHCS**)

Other Certifications and Activities

- Local chair for the Summer School on "XR Research Methods" at the University of Sydney, 2025.
- Co-organized Workshop on "Distributed Mixed Reality" at the University of Sydney, 2024.
- Co-led hackathon, focused on developing social augmented reality experience for the zoo, at the University of Melbourne in 2022.
- Guest Lecture for Design and Development of Immersive Environments (IGB388) at the Queensland University of Technology, 2023. Coordinator: A/Prof. Selen Turkay.
- Guest Lecture for Usability Engineering (COMP5427) at the University of Sydney, 2023. Coordinator: Professor Judy Kay and Dr. Zhanna Sarsenbayeva.
- Guest Lecture for Usability Evaluation Methods (INFO20004) at the University of Melbourne, 2021. Coordinator: Dr. Melissa Rogerson.
- Organiser for the masterclass seminar series in the Human-Computer Interaction Group, University of Melbourne, 2019.
- Machine Learning by Stanford University on Coursera. Certificate earned at Tuesday, July 24, 2018 5:51 AM GMT
- "Exchange Programme for Japan-SAARC University students under the Kizuna Programme" in Japan, 2012.
- Attended Robotics Workshop by Robosapiens India in Tezpur University 2012, India.

Funding

Snap Creative Challenge Grant (A$ 17,218) 2021
- Funding Body: Snap Inc.
- Title: Social Augmented Reality at the Zoo.

Engaging Science Grants Program (A$ 20,000) 2024
- Funding Body: Department of Environment, Science and Innovation; Queensland Government.
- Title: Interactive Eco-Explorations: Engaging Queensland's Youth and Public in Conservation.

Digital Science Initiative Ignite grant program (A$ 6,500) 2024
- Funding Body: University of Sydney
- Title: Enhancing Mixed Reality: Quantifying and Accommodating the Effects of Situational Impairments on Mixed Reality Headsets.

Student Project Supervision

PhD Student (co-supervision):
- Intelligent Blending of Distributed Physical Spaces for Remote Collaboration in Mixed Reality. (*current*)

Master's Projects (co-supervision):
- Influence of Multi-Tasking in Mixed Reality on Contextual Blindness. (*current*)
- Augmented Reality Target Selection and Searching in the Mirror. (*completed*)
- Effects of Immersion and Active Experimentation on Learning in Virtual Reality. (*completed*)

Bachelor's Project (co-supervision):
- User-Agent Interaction with Dialogue AI and Speech Commands in Augmented Reality. (*completed*)

Research Internship Projects (co-supervision)
- Queensland University of Technology (*5 students - complete***d**)
- University of Sydney (*1 student - completed*)

Research Skills

- Quantitative methods (Experimental design, statistical analysis using parametric and non-parametric approaches, equivalence testing).
- Qualitative methods (Interviews, questionnaires, rapid ethnography, data analysis using the general inductive approach).
- Experience of writing ethics applications for human subjects research.

Tools

- **Proficient with**: Unity, Java, JavaScript, Java Spring framework, Hibernate, C, C#, Python, R, .NET Core, .NET Framework 3.5.
- **Familiar with:** Keras, Tensorflow, C++, PHP, PERL, Visual Basic, ASP, JSP, SQL (MySql, Postgresql), Haskell, Prolog, AWK, jQuery, Ajax, Apache Hadoop, CSS, Go.