

Upcoming Events Promotion !!

The first **Day-and-night Ecological Workshop** is tentatively scheduled to be held in **September 2025!**

By joining, you will learn about the ecological survey findings, related village cultural stories, the development process and the application of AR tools in identifying the key species. We would also discuss ideas on conserving and revitalising island's natural and cultural resources.

Event details will be announced soon.
Please stay tuned for updates!



Overview

The research project, '**Application Research on Augmented Models and Smart Experiential Engagement in Ecological Conservation of Yim Tin Tsai, Sai Kung**' (Project Number: EEB(EB) 27/24/11-48), successfully launched on 1 September 2024. For easy recognition, we have named the project **Exploring YTT Nature ARchive**.

This project is funded by Countryside Conservation Funding Scheme (CCFS) and the Countryside Conservation Office (CCO) under the category of 'Research Activities on Countryside Conservation and Revitalisation'. It is in collaboration with the Division of Integrative Systems and Design at The Hong Kong University of Science and Technology, Outdoor Wildlife Learning Hong Kong, Yim Tin Tsai Village Committee, and the Salt and Light Preservation Centre.

The project team is utilising **Augmented Reality (AR) technology to showcase the ecological richness of Yim Tin Tsai (YTT)**. This initiative aims to create an innovative, interactive, and stimulating learning experience that deepens villagers' understanding and interest in the island's ecology, biodiversity, and the use of smart technology for nature conservation among villagers, local community members and the public. Eventually, we seek to raise awareness, foster a sense of responsibility, and encourage engagement in promoting and conserving the island's natural and cultural resources. Further, we wish to contribute long-term benefits to remote countryside conservation and revitalisation efforts by highlighting the potential and significance of integrating smart technological innovation into ecological research and nature conservation.

Throughout the three-year project period, a series of research activities and public events are planned, including ecological survey, day-and-night ecological workshop, smart ecological game-based station, and AR-based guided tours.

Whether you are a nature lover or a technology enthusiast, please stay tuned for updates on this project!

Scan the QR codes to visit our website and social media platforms for latest event information and research findings updates!

Website



Facebook



Instagram



Continuing the previous efforts

If you've been keeping up with the countryside revitalisation efforts in YTT, you might have heard about a CCFS project called *'Yim Tin Tsai Storytelling'* (full title: 'Cultural and Historical Conservation and Revitalisation Research of Yim Tin Tsai, Sai Kung: Community Narratives and Public Experiential Engagement') conducted by the research team from CUHK from January 2022 to June 2024.

The previous initiative received tremendous support from local villagers and the community. The primary focus was on YTT's rich cultural and historical heritage, and one of the findings highlighted that the Island's unique countryside landscapes—from uninhabited nature to tranquil villages—offer visitors multiple and attractive sensory experiences. To extend the previous efforts and enhance the conservation of natural and cultural heritage, we are now delving deeper into the ecological aspects of YTT.

In addition to showcasing the current ecology and biodiversity of YTT with AR technology, our team aims to highlight the interconnectedness of rural livelihoods on YTT and the environment.

Therefore, we reviewed the 183 stories collected from the previous project through interviews with Yim Tin Tsai villagers and Ching Po School alumni.

Beautiful illustrations portraying the past rural environment



Of these, more than 60 narratives mentioned about YTT past natural environment and local community's contacts with nature, which show the significance of nature to the rural living. These stories transport us to key locales on the Island such as the hills, sea, fields, wells, and salt ponds, where people's livelihoods, leisurely pastimes, campus life, religion and cultural traditions of the village intertwine with the nature.

We will continue to integrate primary data and conduct literature reviews of second-hand data, regularly sharing these interesting rural stories and information on our website, social media platforms, and public events.

Lesson 101: Introducing key topics

What is biodiversity?

Why are nature and biodiversity conservation important?

Biodiversity, or biological diversity, is the variability among living organisms from all sources, including diversity within species, between species, and of ecosystem.¹ Such variability is crucial because it helps living things to adapt to the changes in physical environments and to fulfill their specific roles in their living milieu.² All living organisms, including human, rely on interconnected ecosystems for survival.

Greater biodiversity could lead to healthier and more stable ecosystems. We are hugely benefited from the ecosystem services, including (1) provisioning services e.g. food and water, (2) regulating services e.g. flood and air purification, (3) cultural services e.g. tourism and recreation, and (4) supporting services e.g. habitats for all species.³

Because biodiversity is part of nature, protecting nature helps biodiversity thrive, which, in turn, supports our sustainable development. In 2016, Hong Kong launched its first Biodiversity Strategy and Action Plan. This plan focuses on improving how we promote biodiversity and contributing to national and global efforts in implementing Convention of Biological Diversity. One of the actions is to explore innovative methods to enhance, support and promote the conservation of rural areas with high ecological value.⁴

Our project team believes that YTT is home to an incredible variety of species living within its diverse habitats. With support from CCFS and CCO, we're excited to conduct this study to better understand the island's ecology and biodiversity and promote the conservation of these precious natural resources!

What is AR? How can it be applied?

AR is a technology that adds digital elements (images, 3D models) onto the real world. By blending physical and digital objects in real-time, it enhances our perception of the environment and makes it more interactive. Popularised by applications like Pokemon Go, AR has been applied to many fields, from production line management to tourism.

AR enhances user engagement by adding interaction and information to physical spaces. As such, it has been effectively used in conservation, heritage, and education to create experiences focusing on places and events.⁵

For instance, a research team in Taiwan built a virtual butterfly ecological system.⁶ This application allows students to breed the virtual butterflies and observe and learn about their growing cycle and food-chain relationship in an actual campus garden. Through AR, users can virtually experience environmental phenomena that might only occur in specific conditions in real life. In the US, an AR mobile app allows interacting with natural elements while exploring urban cultural parks.⁷ The app leverages the interaction to teach ecological concepts in more engaging ways.

AR has also been used to convey the history of places through artistic media. In Yim Tin Tsai, the artwork "Through the years to touch you" uses an abstract AR sculpture on the site of the old pier to discuss the experiences of departing and return of the villagers.⁸

These AR experiences can be seen as place-based learning. They help users connect with specific locations and familiarise themselves with their real environment. Our project would also use AR to showcase YTT's ecology and biodiversity. Stay tuned for more updates!

¹ Secretariat of the Convention on Biological Diversity (2011). *Convention on Biological Diversity Text and Annexes* (first adopted 22 May 1992). <https://www.cbd.int/doc/legal/cbd-en.pdf>

^{2,4} Environment Bureau (2016). Hong Kong Biodiversity Strategy and Action Plan 2016-2021. https://www.afcd.gov.hk/tc_chi/conservation/Con_hkbsap/files/HKBSAP_ENG_2.pdf

³ Secretariat of the Convention on Biological Diversity (n.d.). Ecosystem services. <https://www.cbd.int/undb/media/factsheets/undb-factsheet-ecoserv-en.pdf>

⁵ Paananen, V., Kiarostami, M. S., Lik-Hang, L., Braud, T., & Hosio, S. (2023). From digital media to empathic spaces: A systematic review of empathy research in extended reality environments. *ACM Computing Surveys*, 56(5), 1-40. <https://doi.org/10.1145/3626518>

⁶ Tarnag, W., Ou, K.-L., Yu, C.-S., Liou, F.-L., & Liou, H.-H. (2015). Development of a virtual butterfly ecological system based on augmented reality and Mobile Learning Technologies. *Virtual Reality*, 19(3-4), 253-266. <https://doi.org/10.1007/s10055-015-0265-5>

⁷ Wu, Y. C., Bogosian, B., Yenney, J., Coleman, P., Jalali, D., Pallag, J., Nassa, A., & Sharkey, T. (2024). Balboa Park alive: Exploring biodiversity through mobile augmented reality. *Special Interest Group on Computer Graphics and Interactive Techniques Conference Appy Hour*, 1-2. <https://doi.org/10.1145/3664294.3664358>

⁸ 「X-ART」 (2024). Through the Years to Touch You. <https://skhartsfestival.hk/en/work/through-the-years-to-touch-you/>

Research Progress

Ecological survey



Villagers, volunteers, and surveyors worked together to identify plants along the trail



At first glance, the plants along the coast appear unremarkable, but a closer look reveals some surprising discoveries!



Binoculars, cameras, a notepad and pen (and a flashlight for nighttime!) are useful equipment for ecological surveys



Surveyors carefully observed small butterflies moving among the bushes

To establish a baseline understanding of YTT's ecology, a key project deliverable is a comprehensive ecological survey **to identify and document the island's flora and fauna**. The primary ecological data would allow us to understand the (relative) abundance, diversity, and distribution of species across various habitats on YTT, eventually evaluate the island's ecological value.

Prior to the survey began, the surveyors identified **seven key habitat types on the Island: woodland, shrubland, village, mangroves, coast, salt pan, and former farmland**. The survey route passes through 10 fixed points on the Island to cover these diverse habitats. The survey targets on **flora and fauna** (birds, butterflies, dragonflies, reptiles and amphibians, and epifauna). We employ a combined approach using both point counts and transect methods to collect data.

Since September 2024, we have conducted at least one survey each month, recording species along the designated route. Recognizing that the presence of target species is influenced by factors like temperature, weather, and time of day, the duration of each survey—either one day or two days and one night—is adjusted seasonally. The target species of each survey thus vary accordingly.

To further enhance the village's capacity for nature and cultural conservation and revitalisation, we invited **villagers, staff, tour guides, and volunteers on YTT** to participate in the ecological surveys. We believe the first-hand experience could enrich the local community members' understanding of the Island's ecology and biodiversity, deepen their connection with the natural environment, and motivate them to participate in future conservation and revitalisation efforts.

The collaboration between our surveyors, with their extensive ecological knowledge, and community members, with their intimate understanding of the island, is proving mutually beneficial. Community members are eager to learn more about the species from our surveyors, with the goal of sharing that knowledge with future visitors. In turn, the villagers share their own stories and experiences related to the species the surveyors identified. For instance, when surveyors found the Pop-gun Seed (*Bridelia tomentosa*), a villager shared her childhood memories of playing 'crackling bamboo gun', using the tree's seeds as the 'bullets'. Such exchanges are fulfilling and precious!

The surveys will be conducted throughout the research period. More detailed results from our first phase will be presented at public events later this year. In the meantime, we want to keep you in the loop – here's a glimpse of what we've already uncovered!



Little Egret



Blue Dasher (Female)



Asiatic Painted Frog

From September 2024 to February 2025, we recorded...

Butterfly



79
Species

Bird



58
Species

Reptile and
Amphibian



12
Species

Dragonfly



13
Species

Mammal



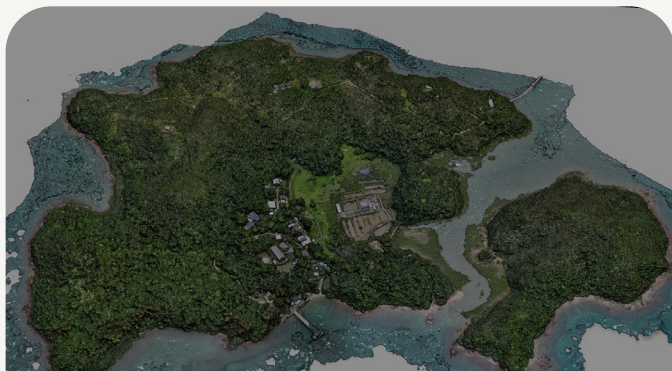
© AFCD
1
Species



Gram Blue

Developing projected augmented model of YTT Island

At the first stage of developing the projected augmented model of YTT Island, our team deployed drones to capture the topology of the Island. To ensure a highly detailed and accurate 3D printed model, we conducted a comprehensive photogrammetry scan. After collecting valuable data of the island, we were able to analyze and process the terrain scan in a photogrammetry software such as RealityCapture, followed by manual finalization in 3D modeling software Zbrush and Maya.



An accurate 3D re-creation of the Yim Tin Tsai village and nearby salt pan



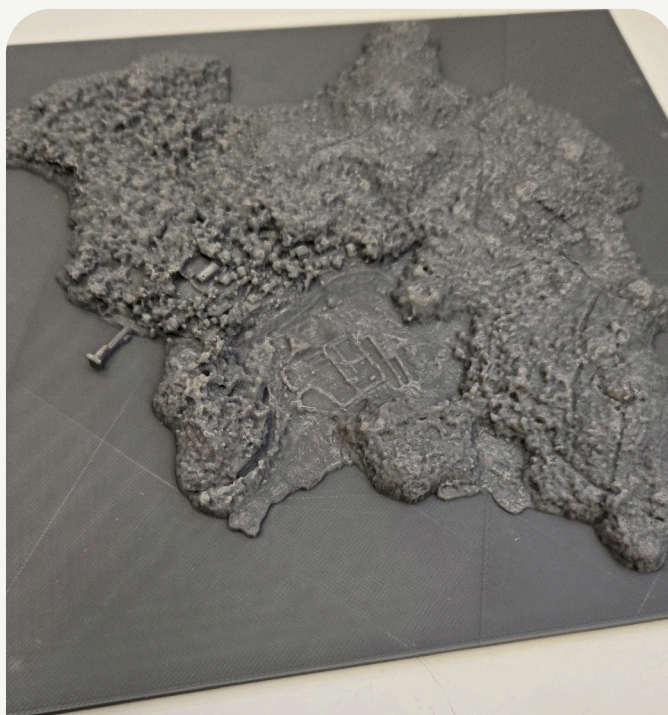
Aerial shot of the Yim Tin Tsai Island

We then conducted several small-scale 3D prints. This is a crucial step before generating the final 3D printed model as it allows us to verify that the delicate details and proportions would be accurate on a large-scale model.

Scheduled for launch in **late 2025**, our **Smart Ecological Game-based Learning Station** will feature a final 3D printed model enhanced with data from the ecological survey. We cannot wait to share more when the time comes!



First 3D printing test with highly detailed model of the village section



3D printing test of the main island