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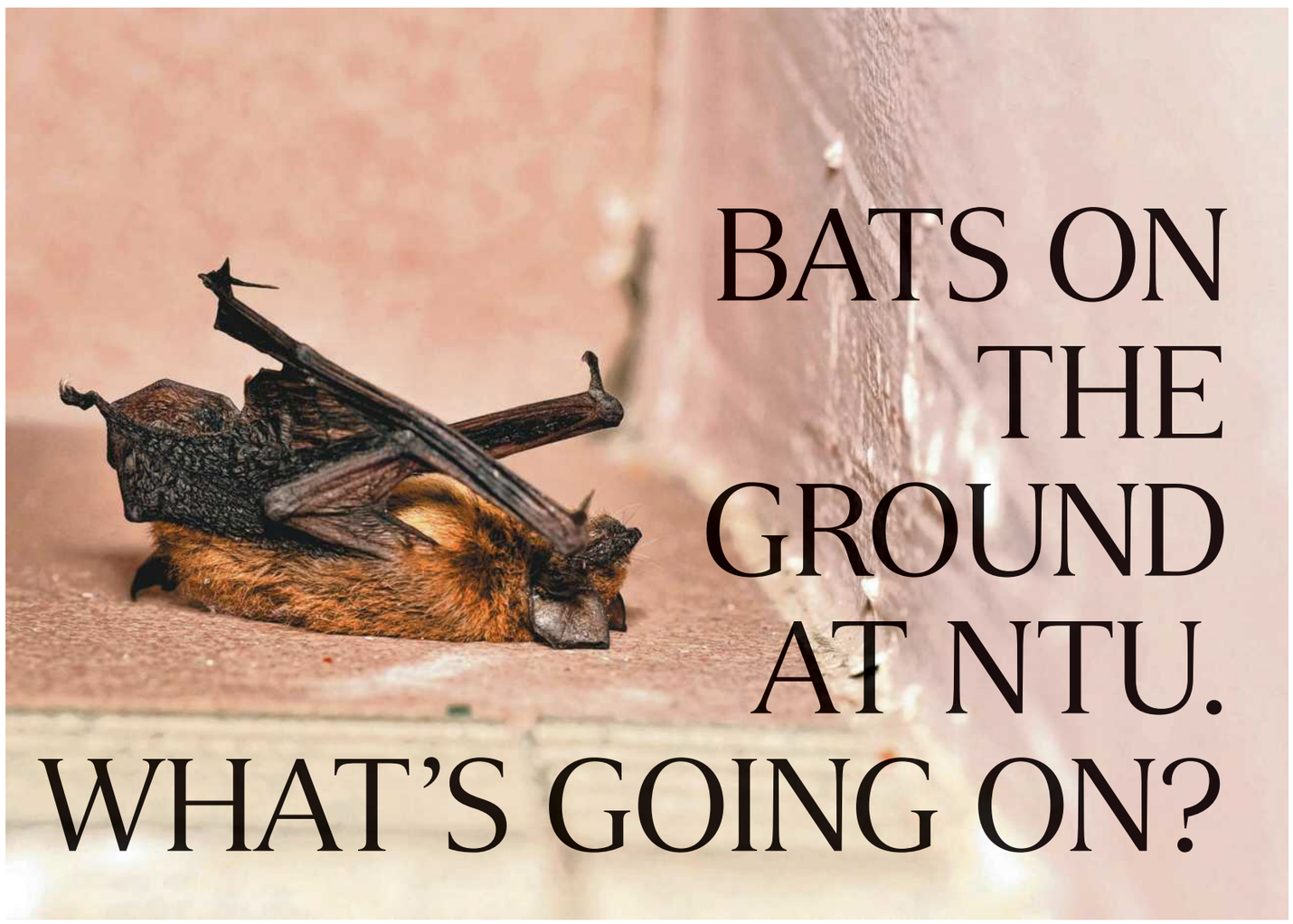
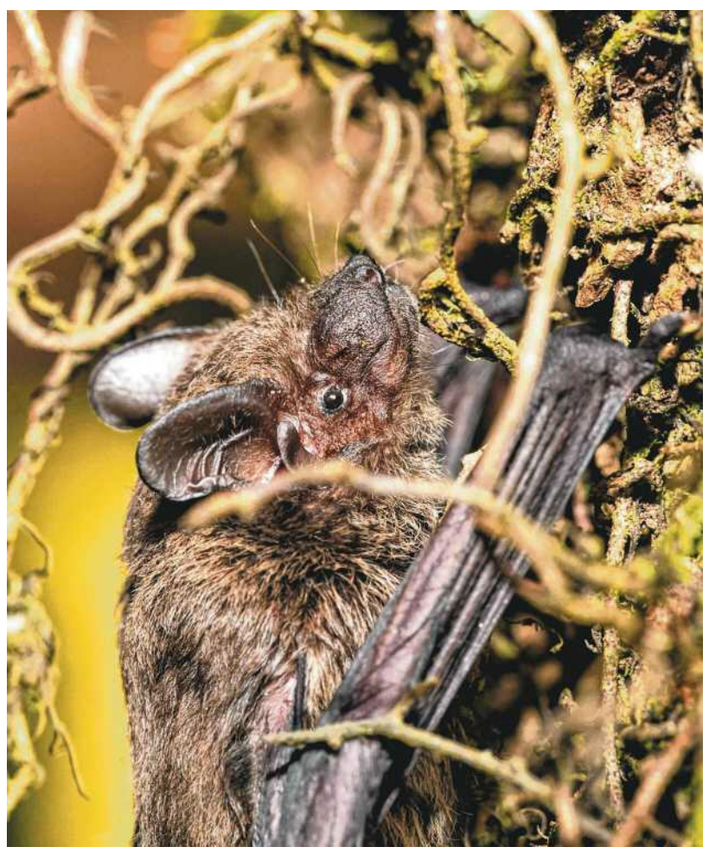


BATS ON THE GROUND AT NTU. WHAT'S GOING ON?



A Javan pipistrelle spotted around NTU's Halls of Residence. One of the smallest bat species in Singapore, the insect-eating creature grows to the size of a human thumb and commonly roosts on trees and building structures.

Left: The bat groundings in NTU are especially concerning as they involve only the Javan pipistrelle (*Pipistrellus javanicus*). PHOTOS: EMMA CHAO

Students conduct study to find out why 45 bats have fallen to ground there since Aug

Zachary Lim

Lifeless bodies have been found around the Nanyang Technological University (NTU) campus – some of them with their little wings splayed out, while others were curled up.

These bats were grounded and unable to take flight.

Since August 2024, 45 bat groundings and deaths have been reported across NTU. Of these, 15 groundings and seven deaths were reported in 2025 between mid-January and mid-February.

The National Parks Board (NParks) said that while grounding events of various species of bats have been reported outside of NTU, there has not been any other location with a similar concentration of such incidents.

NTU environmental and wildlife student interest group EarthLink began rescuing these grounded bats in 2024.

Ms Karina Lim, EarthLink director at that time, said she and her team initially suspected that the bat groundings might be linked to pesticide fogging. But they quickly dismissed this possibility as checks found no fogging had been done in the area in the weeks they were consistently finding grounded bats.

As most groundings were reported around NTU's Hall of Residence 9, they hypothesised that the nearby construction of the Jurong Region MRT line that could be causing distress to the bats or impacting their sonar capabilities. But the students cannot prove this.

Learning about EarthLink's rescue efforts, first-year environmental and earth systems science undergraduate Emma Chao and Ms Nicole Dorville, a third-year PhD student from NTU's Asian School of the Environment, came together to find out why the groundings seem to be more prevalent on campus.

"We are both really passionate about bats, so we naturally wanted to look out for those vulnerable to becoming grounded, as well as to better understand and possibly improve the situation," said Ms Chao, 19.

With NParks' support, NTU Grounded Bat Surveys, which was formed by Ms Chao and Ms Dorville, aims to also identify hot spots and threats to the nocturnal mammals. NParks has trained them to handle the animals safely.

The extra-curricular study started in January 2025 and now has 19 other contributors – undergraduates from the School of Biological Sciences, School of Chemistry, Chemical Engineering and Biotechnology, and Nanyang Business School, in addition to Ms Chao and Ms Dorville from the Asian School of the Environment.

It is the first study in Singapore on bat groundings.

Grounded bats are often less adept at launching into flight from the ground, possibly due to exhaustion or injury, or because they are young and inexperienced, said Ms Chao.

This puts them at risk of being crushed in corridors or pathways with high human footfall, or remaining grounded and eventually starving to death.

Wildlife research and rescue group Acres said that the bat groundings in NTU are especially concerning as they involve only the Javan pipistrelle (*Pipistrellus javanicus*), one of the 25 or so species of bats found in Singapore.

Also one of the smallest bat species in Singapore, the insect-eating Javan pipistrelle grows to the size of a human thumb, and roosts on trees and building structures.

According to Nature In Singapore, an online journal of the Lee Kong Chian Natural History Museum, Javan pipistrelles have also been sighted in buildings in Ayer Rajah Industrial Park, National University of Singapore, Paya Lebar MRT station and residential buildings in Punggol and Upper Thomson.

Ms Chao said that one possible reason behind the groundings could be over-reproduction.

"Groundings can sometimes happen naturally during the mating season, when mother bats over-reproduce and abandon pups because of insufficient resources," she added.

Conserving the Javan pipistrelle is crucial for Singapore's ecology, said Ms Lim, now a senior wildlife coordinator at Acres, which is not part of the NTU study.

For one thing, it plays an important role in the control and management of bugs – it eats mosquitoes and night-flying insects.

Ms Lim first learnt about the groundings from a community wildlife watchdog group on the Telegram messaging app in August 2022. Through EarthLink, she encouraged NTU students to report sightings of grounded bats, dead or living.

She and two other EarthLink members managed to save 37 bats between September 2022 and January 2023. This marked the start of a series of rescues by the interest group that is now continued and expanded by NTU Grounded Bat Surveys.

In addition to the Javan pipistrelles, groundings of other species of insect bats have been reported in Singapore – 176 reports in 2024 – with a seemingly higher concentration in Punggol, Yishun and Sembawang, according to Acres.

Commonly spotted species include the insect-eating whiskered myotis (*Myotis muricola*) and lesser Asiatic yellow house bat (*Scotophilus kuhlii*), and fruit-eating lesser dog-faced fruit bat (*Cynopterus brachyotis*).

"People usually request (that) the bats be removed, but that doesn't solve the root of the issue as they have nowhere else to go. Development means greater habitat fragmentation, leaving bats in need of new spaces to live in," Ms Lim said.

NParks noted that no bats in Singapore have been reported to have rabies.

Since 2011, the board has been actively monitoring the local bat population and has not detected any infectious zoonotic diseases from and among bats.

If anyone encounters a bat in their home, Acres advice is to turn off the lights and ceiling fans, and open windows as wide as possible to allow it to exit safely. If it fails to exit after a long time, report it with photographs and videos to Acres' Wildlife Rescue Hotline on 9783-7782.

"What we need to do now is to learn to modify our environments, or best, learn to coexist with them," Ms Lim said.

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TTSH helps refine AI-enabled tool that will calculate accurate insulin dosage

Tan Tock Seng Hospital (TTSH) and biomedical technology company Buzud are working on an AI or artificial intelligence-enabled tool in an app to help diabetes patients accurately calculate their correct insulin dosage before a meal.

Using an AI-trained camera feature in the app, a patient would snap a picture of his food. The app would then identify meal components in the picture and use data from the patient's wearable continuous glucose monitor (CGM) to perform the calculations.

Most diabetic patients today estimate the amount of insulin they should jab before their meals, said senior nurse clinician Lian Xia from TTSH's Department of Endocrinology.

"This has been the way for a long time because there is no simpler way to do it," said Ms Lian, who is spearheading the project on the hospital's end.

She shared that patients of the endocrine clinic often experience anxiety over miscalculation of insulin doses, especially among those newly diagnosed or adjusting to their need for multiple daily injections.

Patients with Type 1 diabetes, advanced Type 2 diabetes, gestational and pancreatogenic diabetes are required to either perform calculations before their meals to know the precise amount of insulin to self-administer before eating, or make a guess based on meals they previously had.

Insulin dose calculation involves a measurement of all the carbohydrates in the meal before performing a finger-prick test to determine the patient's excess blood glucose levels.

Patients would then need to determine how many additional units of insulin are needed to counter any excess glucose and sum up the total amount of insulin required.

This test has to be done multiple times a day.

In 2024, a team of 20 dieticians, nurses, endocrinologists and medical social workers from TTSH started working with the developers of the app, which is also called Buzud, to refine the accuracy of the app's image recognition.

The calculation tool will be launched only when it achieves 99.9 per cent accuracy.

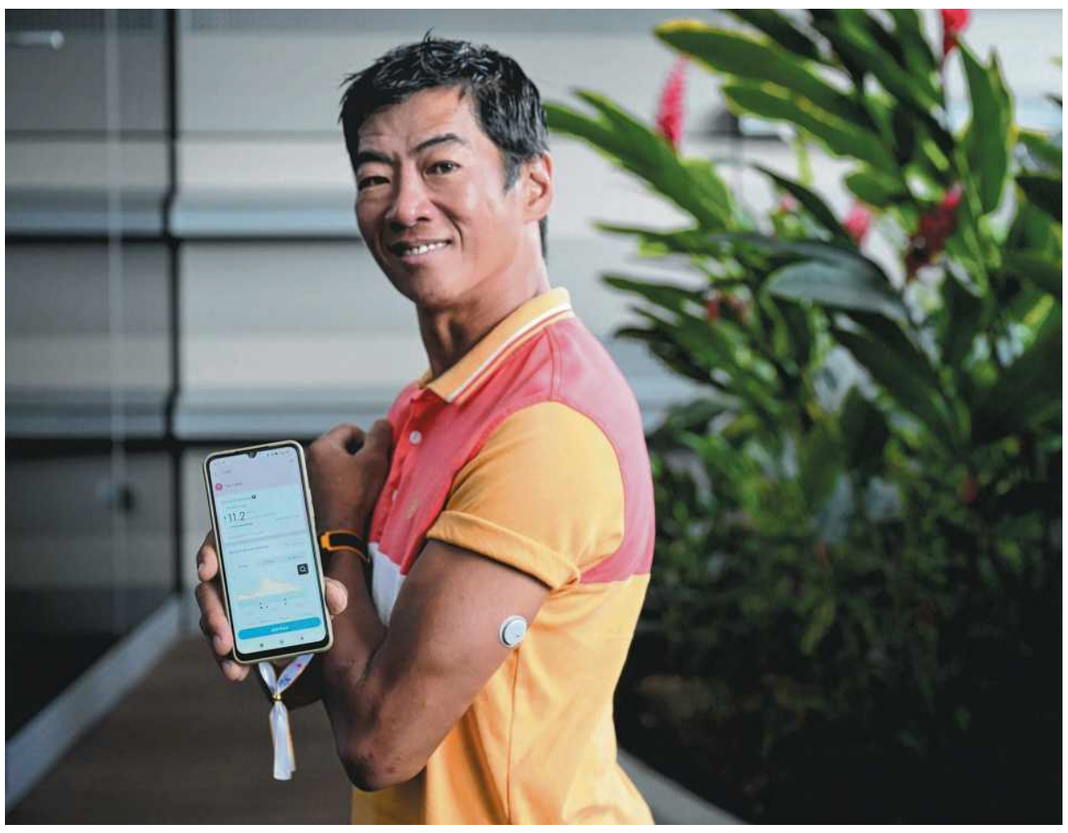
Over the next two years, the meal recognition camera will undergo refinement and clinical trials as the two partners further train the accuracy of the AI to attain that level of accuracy.

Trained on Western and a large number of Asian dishes, it currently has an accuracy of about 90 per cent, according to Mr Frankie Fan, chief executive of Buzud.

Its current limitations include the inability to detect some sauces and condiments, as well as ingredients that are small in size or quantity.

"The camera could fail to pick up small amounts of noodles, for example, or mistake it for something else, because of its small quantity, or the angle at which the photo was taken. Factors like lighting affect the outcome, too," Mr Fan said.

TTSH nurses will continue feeding Buzud information on the nutritional needs of diabetic patients and up to 600,000 more images of foods captured through clinical trials, he added.



Mr Eddie Tan, who has Type 1 diabetes, with the Buzud app and a continuous glucose monitor on his arm. He said that the introduction of the insulin calculator would enable him to "get more adventurous" with food. ST PHOTO: NG SOR LUAN

Ms Lian said: "By contributing to the development of an intuitive, AI-enhanced tool, we hope to bridge the gap between clinical care and real-time decision-making at mealtimes."

No changes will be made to the glucose monitor, which can be self-fitted by the patient and has a lifespan of 15 days.

The monitor – a device that is attached to the inside of the forearm – contains a fine plastic filament that penetrates the skin in order to come into contact with the bloodstream. This filament continuously takes blood glucose levels which are relayed live, every minute, via Bluetooth to the Buzud app on the patient's mobile phone. Patients are also alerted to any abnormal glucose events.

The health management app was launched in 2022, and currently has about 520,000 users across Singapore, Malaysia and Indonesia.

While the monitor and a basic version of the AI-enabled food recognition are currently available, the insulin calculator is expected to be launched in 2027.

Ms Lian said: "We hope this digital solution will empower the patients to reduce the risk of hypoglycaemia (low blood sugar) and hyperglycaemia (high blood sugar). It might potentially reduce emergency visits and hospital admissions, too."

Mr Eddie Tan, 47, is a Type 1 diabetes patient of 15 years. He said that his active lifestyle as a sailing coach requires him to prick his fingers 10 times or more a day – before and after training and meals, and before bed.

Despite having quite a healthy appetite for food, Mr Tan said he has avoided trying new foods, opting instead for familiar food choices to avoid having to go through the ordeal of pin pricks and calculations.

The Buzud app and CGM-user of one year said that the introduction of the insulin calculator would enable him to "get more adventurous" with food, as he could widen his repertoire of food without having to worry about calculating the correct amount of insulin before eating.

"It is nice to know that with everything consolidated on my phone, and (updates) provided in real time, I can rectify things immediately and accurately in times of episodes.

"In the long term, this will be extremely helpful in reducing episodes of hyperglycaemia and hypoglycaemia," Mr Tan said.

Zachary Lim