

DOWN ON THE [BODY] FARM



Australia will soon open its first taphonomic research centre, where bodies will be left in the open (and other places) so we can study how they decay. Why? To help forensic scientists, police and more, as [ANNA DENEJKINA](#) investigates.

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YARRAMUNDI IS 70 KILOMETRES FROM Sydney's city centre, and the site of Australia's first taphonomic research facility, colloquially known as a Body Farm.

The Australian Facility for Taphonomic Experimental Research - the AFTER program - is the first facility to be established for the study of body decomposition in Australia and indeed the Southern Hemisphere. Until now, this kind of research has been done mostly in the US, which has five of these centres.

AFTER began construction in late June 2015, located on a 49-hectare site owned by the University of Technology, Sydney (UTS). It has been established due to the differing environmental conditions between North America and Australia, and thus the required need of "taphonomic" - the study of death and decay - analysis based in varied geographic regions.

UTS will start operating the 200 by 250 metre facility following its completion later this year.



AFTER came about when Australian Research Council (ARC) Future Fellow in the Centre for Forensic Science Professor Shari Forbes identified a need for a field site to work on decomposition research within Australia.

"It's actually been a discussion for many, many years," she says. "It's taken about three, four years to come to fruition, but we've known in Australia that we need this facility for over a decade."

Now the Director of the Australian Facility for Taphonomic Experimental Research, Professor Forbes has been instrumental in the establishment of this facility, which coincides with the opening of a new Body Donation Program at UTS.

"Our body donation program covers a lot of areas of science: anatomical training,

surgical skills, medical research, and now another part of the program is the forensic taphonomy research," she explains.

Prior to the 2014 announcement of AFTER, Professor Forbes estimates that the UTS Body Donation Program attracted around 30 new donors annually. In the last year, however, this number has increased virtually exponentially.

Body Donation Program Coordinator, Mohammed Shareef, notes that the program has now accepted almost 40 new donors specifically for forensic taphonomy research.

Pending the death of its first donor, the official opening of the AFTER program is slated for January 2016. With 30 to 50 research projects to be conducted at the compound, the range of disciplines involved is vast, and includes forensic chemists looking at fingerprints and the length of time available to recover these from a decomposed body; biologists working on DNA; entomologists looking at insects and their participation within the decomposition process; and anthropologists researching the weathering of bones and teeth.

"Everything we do is about assisting the police to either locate victim remains or identify those remains - so somebody's research will always have that as a focus," says Professor Forbes.

"My particular expertise is around scent detection canines, so working with cadaver dogs; understanding the chemical profile of the decomposition odour, and how the dogs actually scent that; locate and track that."

A multidisciplinary project, the AFTER facility will also act as a training ground for police and other forensic agencies in the location and recovery of victim remains, which, in the long-term, may be turned into a coursework program for graduate students.

"We're just very mindful of how much exposure people often have to remains at a certain point in their careers," says Professor Forbes. "We'll probably keep it at graduate level because we know [graduate students] had some exposure or training to date that would prepare them for that."



The tranquillity of Yarramundi is exemplified by the calm expanse on show at the Hawkesbury Heights lookout. Its vertiginous drop sits nearby an empty,



↑ Somewhere on the other side of this ordinary-looking farm to the west of Sydney, scientific donors will "rest in peace" in the open air, in the dry, in the wet, all the name of research.

gravel car park, where Springwood Road becomes Hawkesbury Road - turning into a series of switchbacks up to Winmalee in the Blue Mountains, only minutes after passing that right bend alongside the AFTER facility. Overlooking the Nepean River, the plains, the growing suburbs, and the bushland below, it's easy to fall into the stillness and calm of a scene so vast in its stupefying beauty.

Perhaps it's not a strange place for a body farm after all. Perhaps the essential peacefulness of the district affords a kind of respect. In any case, from the submission of its developmental application to the Hawkesbury City Council in February 2014, to its approval in April of the same year, only three letters of concern were submitted by local Yarramundi residents.

PHOTOGRAPH BY ANNA DENEUKINA

Their apprehensions to the taphonomic research facility included concerns for air quality and odour - particularly during the summer months, which can see average temperatures in the area reach 40 degrees Celsius; assumed reductions in land and property values of surrounding households; and a kind of vague social unease around the idea of allowing human cadavers to "rest" away from consecrated grounds.

UTS addressed all issues raised during its application process, and "since then, to the best of my knowledge, certainly I have not heard, or seen, or received any feedback to indicate that anyone was opposed to [the facility]", says Professor Forbes.

"I am always happy to speak to anyone who wants to discuss [AFTER]...I'm not suggesting that I can convince everyone that they agree with this, but I can certainly hope to address concerns. Sometimes concerns are just a lack of awareness or lack of knowledge about what we're doing, and, by giving people extra information, that actually helps them to accept that concern, or at least neutralise

whatever issue they've raised."



By their very nature, Body Farms do attract unwarranted attention. Over in the US, the Tennessee Anthropological Research Facility was picketed, even though the "residents" of the farm are all volunteers.

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Outrages came from parties from grassroots social justice organisations to veterans' groups, the latter of which protested the Farm in the 1990s. Because of

Body Farms

this history, AFTER's management is taking precautions by utilising high security around, and within the facility grounds.

"It's really about preventing unauthorised access," explains Professor Forbes.

"We recognise that this is a unique facility and there will be people who are curious about it, but, out of respect for the donors, and also for their families, we don't want people wandering up, looking through the fence, taking [explicit] photos [of bodies], and putting those on the web."

A January 2014 security assessment and concept report - prepared by the design, planning, and engineering firm, ARUP.

Included in the report was the high risk of scavenging wildlife interfering with cadavers, which includes larger carnivores like dogs or dingoes, eagles and hawks (yes really), "or anything that can climb up and over the fence, such as goannas," explains Professor Forbes.

"Even though scavenging is a natural part of the decomposition process, because it's a facility that is licensed for anatomical training through NSW Health, under legislation we have to be able to track the remains at all stages, and know where they are..."

Professor Forbes says it's actually a shame that scavengers are excluded from the site, because they represent a normal part of the decomposition process and would provide useful evidence. "It's just not something we can do at this stage," she says.



Having advanced, high security is a far cry from Body Farms of a bygone era, where a wooden-panelled fence enclosing the University of Tennessee's Anthropological Research Facility was sufficient during the 1980s, albeit one that resulted in vandalism

and curiosity seeker walk-throughs.

"I think no matter what you do there is always opposition to it," comments Forensic Anthropologist, Dr Xanthe Mallett. "I think when people realise

that this is a facility to help us learn about decomposition, they [will understand] the fact that it's not voyeuristic; it's not about watching the decomposition, it's what we learn from that [decomposition], it's about

Body Farms

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the next stage.”

Having trained at the Tennessee Anthropological Research Facility, and worked with the Forensic Anthropology Centre at Texas State, Dr Xanthe Mallett - self-described as the real life equivalent of Dr Temperance Brennan of TV's *Bones* - has been at the forefront of showcasing the importance of Body Farm research to mainstream media. Currently a Senior Lecturer with the School of Behavioural, Cognitive and Social Sciences at the University of New England, Dr Mallett's "piece of the puzzle" is fitted in identifying an individual's body "in terms of how old they may have been, their stature, their sex."

She describes the importance of AFTER. "Absolutely, it's going to be invaluable to the whole forensic community in Australia, and internationally," she explains. "Taphonomy facilities in the US have done some amazing work [in] helping us understand what happens to a body after somebody dies, but each environment is so different that without a facility in Australia, or a number of facilities in Australia, we really are guessing at what happens to an individual in [this environment]."

"When somebody is found, be that a murder victim or an unknown individual, it's going to allow us to really understand the times of death much more accurately, and that will allow us to predict how long somebody may have been missing - which allows the police to then go through the missing persons' records and really narrow down that time frame. It couldn't be more important to understand more about time since death, and that's what the facility is going to do in the initial stages."

Australian ethical guidelines in the use of human cadavers are stringent, and are provided by the National Health and Medical Research Council, and the Australian Research Council, both granting bodies of AFTER. In addition to these guidelines, the internal UTS ethics committee assesses all projects and their proposed research, looking at both the ethical treatment of the remains, and the ethics of the researcher, "making sure that it is not going to impact the researcher negatively, and that there are avenues for them to deal, or cope with the sort of confronting scenes," explains Professor Forbes.

"We want to make sure that everything we collect in terms of data from the donors has some real scientific impact and truly benefits somebody, or something long-term. So we have a lot of stages that we move through: scientific

STATES OF DECAY

The rate of decomposition is reliant on many factors, including climate, microorganisms, insect activity, scavenging activity, burial or concealment of the body.

What's more, humans are fairly large animals, and so a single body is often at different stages of decomposition. Here's how it, uh, breaks down.

FRESH

As the heart stops, chemical changes begin to occur within the body, with increased microbial activity. No marked change in appearance (at least compared to what's to come), but the chemical shift begins to attract flies.

BLOAT

Bacteria breaks down tissues and cells. Fluids are released into body cavities, producing gases which create pressure within the body, blistering the skin. This pressure inflates the body and forces fluids out of cells and blood vessels, and into the body cavity. As the rate of decay increases, the body attracts more insects.

ACTIVE DECAY

The body purges decomposition fluids into its surrounding environment, and collapses on itself. A great mass loss occurs due to autolysis (cells dissolving in their own chemicals), bacterial, and insect activity. If in suitable conditions, adipocere (corpse wax) may form.

ADVANCED DECAY

The body experiences a moist decomposition with exposure of bone. Sometimes, mummification may even occur in certain dry conditions.

DRY DECAY AND SKELETONISATION

Only the bones, hair, fingernails and cartilage remain of the body. The cadaver becomes dry and decay continues slowly, leading to a skeletonisation of the body, where only the bones remain.

merit assessment; the assessment of ethical treatment of remains; the assessment of ethics associated with the researchers - we do all of that before we start the research project."

All cadavers received by the UTS Body Donation Program are screened for various infectious diseases and other potential disqualifying factors. This requirement means if you sign a Donor Consent Form, it does not guarantee acceptance of your body into the program.

Such circumstance arises if a potential donor returns a positive blood test for infectious diseases, or if the donor has any diseases on the NSW Department of Health's exclusion list, including Creutzfeldt-Jakob disease (a degenerative brain infection), Hepatitis C, HIV, Diphtheria, Plague, Respiratory Anthrax, Small pox (very unlikely, but there it is), Tuberculosis, or any viral haemorrhagic fever.

Having accepted over 100 Donor Consent Forms over the last two years, including almost 40 donations specifically for research at AFTER, UTS Body Donation Program Coordinator, Mohammed Shareef, described that the most common motivation for donors to leave their body to scientific research has been in helping society, even in death.

The second most common? A desire for environmental sustainability - a natural process of returning to earth, without coffins and anthropogenic materials.

"That's where they came from; that's where they're going. Some other people have very specific reasons, but those are definitely the most common," says Professor Forbes. "It's just a really unselfish, giving nature of the donors to recognise that even after death they can still be helping society."

Echoing these same sentiments is writer, comedian, and future body-donor Glen Trickle, who has made the decision to donate his body to continue contributing to society and science, even in death.

"I try to promote science while I'm alive, so it will be a good way to continue after death as well," he says. "Even just as an issue of resource management, it doesn't make sense to me to put a body in the ground, or cremate it, and [give] really no benefit for the world that you're leaving behind. There [are] so many different areas of science, and research, and other fields, which need bodies to advance."

In 2013, Trickle wrote about his decision to leave his body to science which



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It can be confronting to think we all end up like this, but this donor has contributed significant data to science, rather than just taking up space in a traditional cemetery.

prompted some people to ask why, "but nobody really seemed to object," he laughs.

"For people who know me, I guess it just seems like the sort of thing that I would do, so no one really thought too much about it."

Not yet having chosen which scientific field he wants his body to be used in, for now Glen is leaning toward anatomical research, "or if the space program needs a dead body for anything, I would sign up for that first. I'm too afraid to go to space alive, so if sending me to space helps anybody, I think that would be fantastic."

Professor Forbes' expertise in the chemical processes occurring in soft tissue decomposition has seen her collaborate with the New South Wales Police Force, the Australian Federal Police, and Fire and Rescue NSW in

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the recovery of human remains, both adult and children. Despite this confronting work, Professor Forbes notes that it does not affect her negatively, but acknowledges that it is often very challenging.

"I am like any scientist, and probably like clinicians, and

medical doctors," she says. "We always show respect to every donor, and we recognise the contribution they are making. But we're also clinical and scientific about what we're doing, so we don't overthink, we don't start to think about what this person might have been like during life, we don't ask questions about the person, we don't need to know their background, and sometimes it's better not to. So we're always scientific, we're always thinking about what it is we're doing."

"That's not to say that if we're helping the police and we're searching for a victim and we find them that it's not emotional at the time. But, again it's still a positive because you're ultimately thinking that this victim has been found; they'll be identified, their family will now have closure, and that is a positive thing, that's not a negative."

Even after two decades of research in forensic science and with human remains, Professor Forbes' work doesn't cause her to dwell on her own mortality, despite having made the decision to donate her body to the field - quite literally.

"I haven't signed the [donor] forms because I'm still of the belief that I'm too young to die," she laughs. "So, it's one of those stupid things that everybody thinks, and you would think that I would have more sense - but the important thing is my family knows my wishes."

Taphonomists face unique challenges in their work. Such as the prospect of encountering a donor who was once a friend... or even family. Yes: Professor Forbes' parents are donating their bodies to UTS, but she won't have contact with them after their passing.

"No. No, I wouldn't want to, and UTS wouldn't allow me to," she says. "At the time that they donate and come into UTS, I will make Mohammed [Shareef, Body Donation Program Coordinator] aware because I'm the senior next of kin, and at that time he will make sure I have no contact with them."

But she will be thinking about them. "I definitely will. But ultimately, I know that they're doing what they want to, and they're giving back to science, and that's a positive thought, not a negative one." P's