

'The evil you can't see': Terrifying reason rich lister Twiggy Forrest on a quest to save the planet

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Rich-lister turned ecowarrior Andrew Twiggy Forrest is fighting for our right to have “clean blood”, through groundbreaking new work at the University of Queensland.

A bone-shattering hiking accident in the Kimberley region of Western Australia. A one-of-a-kind, hi-tech plastic research laboratory in Brisbane. And mining magnate Andrew Forrest the multimillion-dollar link in it all.

The universe works in mysterious ways.

In late 2015, Forrest, one of the world's richest people and founder and chair of Fortescue Metals Group, slipped off a ledge while trekking in WA, hooking his leg awkwardly into a tree branch. His knee bent the way a knee should not, shattering his kneecap and surrounding bones and very nearly claiming his life.

From this misfortune, he endured a long, two-year recovery that included knee replacement surgery, time using a wheelchair, then crutches, then a walking stick and having to “lie still for a very long time”.

But this forced physical incapacity gave Forrest, who grew up camping on the Urala coast – a landscape of “burnt orange earth that meets bright blue water” – near his childhood home of Munderoo Station in WA's Pilbara, the chance to embark on a long-held ambition to complete a Masters degree studying the ocean. It was the silver lining from it all.

Forrest – unofficially rejected from a Masters with a suggestion he instead do a PhD – began his study in 2016 and now holds a marine ecology doctorate from the University of Western Australia. His four years of study delved into the major influences humans are having on the oceanic environment.

He emerged convinced the burning of fossil fuels is irresponsible, that green hydrogen is “an essential part of the future” and that key issues of deoxygenation, overfishing and plastic pollution are caused by humans and must be fixed by us too.

Professor Sarah Dunlop was Forrest's PhD supervisor and says he was “one of my best students ever”. Speaking from Perth, Dunlop recalls how Forrest “completely knocked me off my feet” with the question: “Professor, do you think plastic gets into the human brain?”

Forrest, 60, also known by his childhood nickname of Twiggy, has always been a man of action, sometimes called “a salesman of the impossible”, with a personal motto of “never ever give up”.

Since this initial contemplation, his philanthropic Munderoo Foundation, co-founded with his wife Nicola in 2001, established a Plastics and Human Health program, headed by Dunlop, and invested \$4.5m for a custom-made Plastics and Human Health laboratory at The University of Queensland's The Pharmacy Australia Centre of Excellence (PACE) at Woolloongabba.

Here, researchers in the Queensland Alliance for Environmental Health Sciences will study microplastics, nanoplastics and the chemicals that leach from plastic products to determine if they are present in human brains, blood and urine.

Speaking from his base in Perth, Forrest says the pioneering work in the UQ lab is taking on “one of the huge issues challenging nature and humanity”.

“We have a right to clean blood,” he says.

“If you have dirty blood, you are going to get sick, it’s just a matter of how that sickness forms in you, how it shows itself and how quickly it harms and kills you. That is the simple, scientific bottom line.”

Forrest says therapeutic nanoparticles are already used to attach medicine to penetrate the human blood-brain barrier to treat conditions such as brain tumours.

But this research will determine if nanoplastics via environmental exposure are present.

He likens nanoplastics to a “burglar armed with a knife and a gun” who has broken into your house while you sleep.

“What we don’t yet know is what harm the burglar is going to do to your house. We have not yet assessed what that damage is,” he says.

“Macro and microplastic are on a journey and that ultimate destination is nanoplastic. Every single bit of plastic on this Earth is going to evolve into nanoplastic.

“It’s the evil you can’t see ... it’s an invisible threat, the plastics you cannot see.

“We’re not even measuring it (nanoplastics) yet. That’s why Sarah’s work and the Queensland lab work is pioneering and critical to the human race.”

Plastic never truly disappears. Instead, it breaks down, fragments and degrades into smaller and smaller pieces called microplastics and, even smaller still, nanoplastics.

In our modern world, life without plastic – cheap, lightweight, versatile, convenient – barely seems possible. A 2019 Plastics Europe report put global plastic production at almost 360 million tonnes.

Plastic is, simply, everywhere that scientists have looked – in our air, soil, rivers, oceans, plants, food, water and animals.

There are vast vortices of floating microplastic and plastic debris in the oceans. It is in Arctic sea ice, in remote mountain lakes, in the world’s deepest ocean trench, at the summit of Mount Everest.

Some scientists argue plastic pollution is so ubiquitous it should now be considered a defining feature of an Anthropocene Epoch – the time period of the Earth shaped by modern humans.

Plastics are leaching off our synthetic-blend clothes as we walk around and spewing out of our clothes dryers inside our homes. They come off plastic kitchen cutting boards and the packaging on fruit and vegetables. They are sloughing off the carpet as we walk upon it.

Plastic microbeads are also added to many cosmetic products, such as toothpaste, shower gels, face scrubs and creams, to achieve a cleaning effect.

Microplastics have been widely found in the seafood we eat; in the tap water we drink; in fact, in just about everything in between – sea salt, beer, honey, rice, vegetables and tea.

A University of Queensland study of rice alone found that people are consuming 3-4mg of plastic for every 100g of rice they eat (with numbers fourfold higher in instant rice), adding up to about one gram of plastic per person via rice every year.

And you may think you are doing your bit to save the planet by reusing your bottle of spring water but every time you screw the lid back on and off, you are likely swallowing an added slew of microplastics.

Even in the great outdoors – where you may be lying on the beach, enjoying nature, feeling the sand fall between your fingers – look closely and you may find you are holding tiny, lightweight plastic pellets or microplastics called nurdles that are the raw material in the plastic manufacturing process.

Billions of these pellets are transported around the world to make countless types of plastic products but many end up in the oceans from accidental spills in transit or wherever the nurdles are handled. They are likely found on every beach in the world.

And here's something else you may never have thought about. What happens to the tread on your car's tyres when it wears away from use?

Scientists have found that, far from disappearing, tyre and brake pad wear ends up as "invisible microplastic", hanging around in the gutters of our highways and roads until rain or a storm event washes it all into our waterways and eventually out into the oceans.

Last year, UQ researchers estimated there was 850kg of invisible microplastic on roadsides in the Brisbane council area alone. Other studies show fine windborne tyre and brake dust could be a bigger source of ocean microplastic pollution than rivers.

Even normal household dust is filled with plastics.

A 2021 Macquarie University analysis of the airborne dust from homes found almost 40 per cent of it was microplastics, with a greater exposure for young children who typically spend a lot of time on the floor and put things in their mouths. Study researcher Professor Mark Taylor, now Victoria's chief environmental scientist, says we are all exposed.

"We are living in a sea of microplastic from which we can't escape," he says.

"We inhale it, we ingest it. When microplastics lodge in your lungs, they are not going to biodegrade. The consequences of our exposure are yet to be known but it's unlikely to be good."

The amount of microplastic humans consume is uncertain but best estimates are thought to be about 1000 plastic particles a day through food, water and air, although it has been put as high as 5g of plastic a week – the equivalent weight of a credit card.

Dunlop says there is a growing amount of scientific literature relating the chemicals that leach from plastic to health issues ranging from reproductive health, miscarriage, endometriosis, obesity, diabetes and heart attacks but says there are still many thousands of plastic chemicals about which science knows very little.

She also points to a 2021 study published in the Environmental Science and Technology journal that found people with inflammatory bowel disease had significantly higher microplastic concentration in their faeces compared with healthy people.

It also found people who drank bottled water or ate takeaway food had about double the concentration of microplastics in their stools.

Scientists already know we exist in a sea of micro and nanoplastics and that we are inhaling and swallowing it daily. What we do not yet know is how far the smallest nanoparticles are able to penetrate into our bodies and if all this plastic is actually doing us any harm.

Minderoo's Plastic and Human Health laboratory is the only known purpose-built lab that adheres to such strict and minimal use of plastics.