

Bubble Engineering

Changing the way we deliver medicine

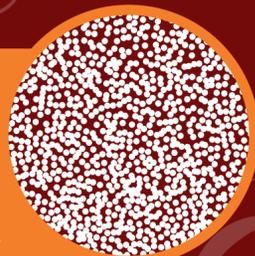
The challenge

Medicines for treating serious diseases such as cancer and strokes are becoming more powerful. But the challenge is delivering these medicines to **specific places in the body** and minimising side effects.



Microbubbles

We can use **tiny gas bubbles, 100 times smaller** than a human hair, as vehicles to deliver drugs. The bubbles are **injected into the blood stream** and the drug is only released when the bubbles are "**popped**" using ultrasound.



Case study: Eleanor Stride

Professor at the Institute of Biomedical Engineering in Oxford.

Eleanor studied Mechanical Engineering at university and became fascinated with the physics of ultrasound. This led to her undertaking a PhD on the use of microbubbles in medical ultrasound imaging. Since her PhD, she's focused on how microbubbles can be used to treat disease.



Real time feedback

Because bubbles are **full of gas**, when they are exposed to ultrasound, they produce **really strong echoes**. These allow us to **track the bubbles' progress** through the body in **real time**.



Making bubbles



It is important that we **control the size** of the bubbles and the **amount of drug inside** them. We use **techniques** such as **microfluidic processing** to manufacture bubbles with the right properties.

Targeting in the body



We still need to make sure that the **bubbles get to the right place**. We can **coat the bubbles** with molecules that make them "**sticky**" to particular types of cell. We can also make them magnetic and use a **strong magnet** outside the body to collect them **at a target**.