



Where I work Sheila Rowan

Photographed for *Nature* by
Kieran Dodds.

As an experimental physicist, I like doing things at tabletop scale that contribute to bigger goals. One such goal is measuring gravitational waves – little ripples in the curvature of space-time. These ripples result from astrophysical events such as star collisions, which cause tiny changes in the direction of the force of gravity and stretch and squash distances here on Earth.

Gravitational-wave observatories use laser beams to measure these changes. A laser source sends out two light beams, which bounce off mirrors and come back to a sensor at the starting point. If gravitational waves change the distances between the starting point and the mirrors, the returning light beams will interfere with one another in such a way that makes the light flicker on the sensor. For this to work, however, the mirrors must be completely still. We therefore suspend them from very fine glass fibres to isolate them from the seismic activity of Earth and other sources of movement. The small part of the observatory that I'm working on is the

glue-free chemical bond used to attach the fibres to the mirrors.

Here, in my laboratory at the University of Glasgow, UK, I'm reflected in a mirror attached to glass fibres. By measuring how laser light at two different frequencies reflects off the interface between the mirror and the glass, just as my image does off the mirror, we can work out the thickness of the bond and other properties that are important for designing optical systems.

As chief science adviser to the Scottish government, I also provide scientific advice to policymakers, work to ensure that residents who want a scientific education can access one, and promote the importance of science to government officials and the public. During the pandemic, I'm working from home, supporting colleagues in clinical medicine and epidemiology.

Sheila Rowan is director of the Institute for Gravitational Research at the University of Glasgow, UK, and chief scientific adviser to the Scottish government. **Interview by Amber Dance.**