Very generally, my research was in further understanding whether two different areas of physics should be thought of as *simile* or *metaphor*.

> *The laws of black hole mechanics are like the laws of thermodynamics*
>
> *— or —*
>
> *Black holes are thermodynamic objects, and the laws of black hole mechanics are the laws of thermodynamics for black holes*

After Einstein's relativity, we understand gravitation as something geometric. A nice visual way to experience this is to imagine a dozen marbles across a trampoline. Placing a bowling ball in the centre, we see all the marbles move towards the bowling ball. From above, we think the bowling ball attracts these objects towards it, but really, the bowling ball curves the space the marbles live within, and this curvature causes the movement of the marbles.

Understanding gravitation as geometry, we can attempt to study the geometry of a certain gravitational object, for example, a black hole. Just like we're used to geometric facts such as "The interior angles of a triangle always sum to 180 degrees" or "parallel lines never touch", we can use mathematics to study the geometry of black holes.

Last century, this was a new and exciting and some brilliant researchers were interested in formulating "truths" or "laws" of the geometry of black holes. Of these facts, some of them were particularly interesting and they became known as the "laws of black hole mechanics".

The most curious part of this research was that by "renaming" some of the pieces of the equations that built these laws, the laws of black hole mechanics seemed to be identical to the laws of thermodynamics. For example, we identify things such as: the entropy of thermodynamics and the surface area of the black hole, or, the temperature of the system and the surface gravity of the black hole. What appeared as a curious coincidence was made more concrete when Hawking proved we can understand black holes as "hot", with a well defined notion of temperature.

For the past 50 years, people like me have been interested in the extent of this relationship. Do all black holes have thermodynamic relationships? Is all of thermodynamics wrapped up into black holes, or just some of it? Are there things we can do to black holes to break this thermodynamic description?

My research was in a special class of black holes with a specific geometry (think about all triangles, and then a special subset where all sides are the same length, or the internal angles are all less 90 degrees). I found new ways to derive black hole solutions and then studied the thermodynamics of these solutions, looking to see how consistent this relationship really was.