Q1 - (from anonymous attendee) Did your time at Newnham and Cambridge help you decide what to research?
Carolin: *Yes, although as my first degree was in Maths, it was more through the extra-curricular involvement with the University Astronomical Society that taught me about different areas of astronomy. They organised weekly talks from all areas of astronomy, and it was from attending these that I realised my real interest was in extra-galactic astronomy, ie the wider cosmos beyond the Milky Way. Also, membership of CUAS allowed me access to the historical telescopes at the Institute of Astronomy, and using these confirmed my desire to be an observational astronomer.*

Q2 - (from anonymous attendee) Is there any point in getting a telescope to start exploring the milky way from home, or should I just look at pictures from the better telescopes?
Carolin: *Of course you should enjoy the photos from the best telescopes across the world. But there is nothing like seeing something with your own eyes, so why not use a telescope as well? Just don't expect it to look as fabulous with the unaided eye as from the Hubble! A useful analogy might be that for example, I enjoy beautiful pictures of birds taken by professional birdwatchers - but this doesn't spoil my enjoyment of identifying and watching them through a cheap pair of binoculars; it's a different experience!*

Q3 - (from anonymous attendee) What is one of your favourite 'real world' applications of knowledge gleaned through astrophysics?
Carolin: *Astrophysics is concerned with testing how the rules of physics work in the most extreme circumstances - of density, heat, timescale, distancescale, mass etc - and so is not in the business of producing 'real world' applications as such. These do occur, but are often indirect and happen many years later (eg the application of Einstein's relativity to the accuracy of your gps navigation).*
There are, however, important crossovers in detection methods to medical physics. Observers are adept at finding ways to collect photons at very low light levels, which can be applicable to researchers wanting to study cell samples without cooking them in the heat from lights!

Q4 - From Char: How are these photgraphs are taken? and how can you capture so much detail in the images?
Carolin: *Most of the images I showed in my talk were taken with some of the best telescopes in the world, both at ground level and out in space. These are often several images taken through a range of filters, colourised and stacked together to reproduce a more 'natural' look. A relatively short (in terms of time) image through a UV/blue filters shows the distribution of the hot young stars across a galaxy, while a narrow-band filter can isolate just the light from excited hydrogen atoms, and tell you something very different about a galaxy. It's worth saying that much astronomy uses images taken in other wavebands - Xray, infra-red etc; and much of the physics we do requires the use of spectroscopy to split up the light from distant galaxies.*

Q5 - From Tara: Firstly, thank you for the brilliant talk! Is Maths a common route into astrophysics?

Carolin: *Most graduate students will have taken a first degree in maths or physics, often specialising in astrophysical options in their final years. It really doesn't make much difference in the long run!*

Q6 - From Barry: how are black holes formed at the centre of galaxies, or do galaxies form around primordial black holes.
Carolin: *This is a very interesting question - we know that every sizeable galaxy has a supermassive BH at its core, and even more surprisingly, the bigger the galaxy, the more massive the BH at its core (though it's still only about 1/1000th the mass of the entire galaxy). This correlation strongly suggests that the BH can in some way influence the development of its host galaxy, and we think they grow alongside each other in a kind of symbiosis. It's not going to be the case that a galaxy forms around a primordial black hole, however, as are not massive enough. It's the early condensations of dark matter that prompt the gravitational collapse into a proto-galaxy.*

Q7 - (from anonymous attendee) Yesterday I learnt that dark matter is continually wooshing through our bodies without us being able to sense it. But presumably we would be able to see and feel it if we were on a planet as our galaxy smooshed against the Andromeda Galaxy?
Carolin: *The reason we don't feel the DM it only seems to react to two of the four forces of physics - gravity and the weak nuclear force (which is involved in radioactive decay). It doesn't respond to either the electromagnetic force - which governs the interaction with light - or the strong nuclear force (which binds atomic nuclei together). This is why we don't feel it wooshing (great word!) through our bodies all the time. The weak force operates only at the quantum level, so getting closer to Andromeda wouldn't help us 'feel' it … except of course through its gravity.*