



Who are you?

Veronica Bray

What do you do?

Planetary scientist at the Lunar and Planetary Laboratory (LPL) in Arizona, USA.

What does your job involve?

I am a planetary scientist at the Lunar and Planetary Laboratory (LPL) in Arizona, USA. I am half-research, half-mission operations. The mission operations part of my job involves 'targeting' the HiRISE camera onboard the Mars Reconnaissance Orbiter, effectively taking photos of Mars from an orbiting satellite. I draw from a database of image requests made by the science team and also the public (via the public suggestion tool HiWish: <http://www.uahirise.org/hiwish/>) and then set up each image capture based on what we know about the surface (how dark/light, rough/smooth it is, etc). These images are then used for science research and to inform decisions on the Mars rovers that are still active on the martian surface. The other part of my job is plain, good old fashioned research! I use the images sent back from space missions to study the surfaces of various planetary bodies (particularly the Moon, Mars, icy moons of the outer solar system and Pluto as I am a member or associate member of the LROC, HiRISE, Cassini and New Horizons science teams).

How did you get there?

I knew what I wanted to do when I was 6 (!) and so made sure to specialise my subjects at GCSE and A-Level to be science-heavy in order to get onto the undergraduate Planetary Science MSci at UCL. After finishing my MSci I came to Imperial College for a PhD on Impact Cratering with Joanna Morgan and Gareth Collins. I researched the results of comet impact into the icy moons of Jupiter using both photo-geology (with images sent back from the Galileo mission) and computer simulation of the impact process itself. I would vary the thickness of crustal layers in my computer models and note how the resultant impact crater morphology would change, and which matched the observed crater morphology. My end result was an estimate of the ice thickness on Jupiter's moon Europa, which might harbour life in its subsurface ocean if its ice shell is thin enough. During my PhD my advisor Gareth Collins sent me to the LPL. This was a great opportunity to get to know people working on active space missions. It was probably due to this foot-in-the-door that I obtained my Post-doc position. I now remain at LPL as an associate staff scientist.

How do you use your skills in geology and geophysics?

Working with planetary mission data requires photo-geology. So my knowledge of geologic processes and how certain landforms look in 'the field' helps to inform me on what might be happening on a planetary body when viewed from above. Many of the planetary scientists I meet got to their position through physics rather than geology. They all seem to appreciate the different mindset (the ability to visualise an area 'on the ground') that someone with a geology background can bring to the team. The maths learnt during my undergraduate is also still very much in use today when calculating suitable sun angles for my Mars pictures (taken with the HiRISE) and just yesterday when I calculated with simple trigonometry how large Pluto would look in the sky when viewed from its largest moon Charon.

What do you love about geology?

Geology is an incredible tool for researching all solid bodies in our solar system (of course including the Earth!). Knowledge of how rocks form and later over time gives us the ability to look back into the past, to find out the conditions that were present when the rock formed, and since. There are so many aspects to geology (chemistry, physics, pure observation...) that a whole host of people from different backgrounds can converge toward a common goal, making for varied departments and research teams.

Your best moment?

...Is about to come, this July! When I was 6 I didn't know that there was a job of 'planetary scientist' but I pictured myself standing in mission control, watching as images of a never before seen planetary body were sent back from a space craft. This July I will do just that as New Horizons makes its closest approach of Pluto. I am incredibly excited to be part of the science team and one of the first humans to see Pluto up close!

Your worst moment?

Having my data stolen. These days I am much more possessive over my own data, but as a bright young thing I was not so careful - I did not assume that once handed over to another person on my research team, they would attempt to publish it as their own! To this day I have still not been as angry as when I found out. Fortunately they could not use the data well enough without me (everyone has their strange way of making notes to themselves that only they will understand later on, right?) and their paper was rejected from 3 different journals. This gave me enough time to write it up myself and publish. It ended well and was an important lesson to learn.