

## Emma Sherratt

*Postdoctoral Fellow, Harvard University*

### NERC PhD student becomes an expert in a rare skill

As a result of her PhD, funded through a NERC CASE studentship, Emma Sherratt has become an expert in X-ray CT scanning – a rare skill that has enabled her to pursue research in an area that fascinates her.

Emma studied for a PhD at the University of Manchester between 2007 and 2011, with the Natural History Museum in London as the Industrial CASE (Collaborative Awards in Science and Engineering) partner. Her project, which she designed herself, followed on naturally from work she had done on an industrial placement with the museum during her undergraduate degree.

The aim of the project was to study the evolution of caecilians' skulls. Caecilians (pronounced *siss-ee-lee-an*) are amphibians, like frogs or toads, but are often mistaken for worms or snakes because they have no legs. Their colour ranges from pink to dark grey and they have ring-like ridges along their bodies, but unlike worms, caecilians have large mouths and sharp teeth that they use to eat invertebrates like worms and termites. Their eyes are covered by bone, so they are nearly blind and only see in black and white, but tentacles on the front of their heads detect chemicals in the soil, giving them a 'sixth sense'. In some species, the young feed on their mother's skin by scraping it off with their teeth.

A highlight of Emma's project was discovering a new species of caecilian in French Guiana. "I was breaking up a rotten log that was lying on the ground, and digging up the soil directly underneath," she explains, "and I found several caecilians in the log, one of which was a new species. It was very exciting for me. It had been many, many weeks of digging and I had only found snakes and lizards, so to find a caecilian was fantastic."

During her PhD, Emma scanned an incredible 700 caecilian skulls, and it was this experience that gave her a unique and marketable skill. X-ray CT scanning makes it possible to see the internal 3D structure of an object, in this case a caecilian skull, without damaging it. "I loved the fact that I got very a useful skill out of my PhD," she says. "Because it's quite rare, so it has made me very valuable. I have collaborations coming out of my ears! And it certainly got me the job here at Harvard."



Emma holding the new species of caecilian she has just discovered



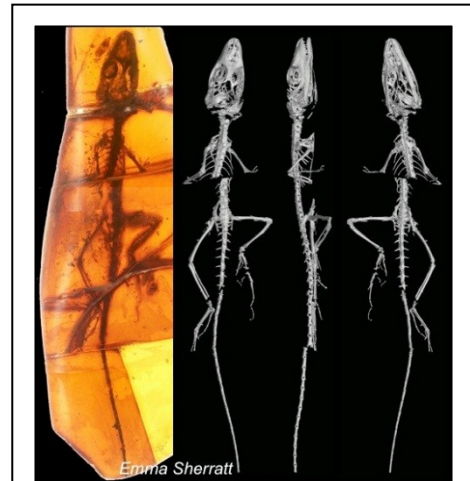
One of the caecilians Emma discovered

Having completed her PhD, Emma is now working as a Postdoctoral Fellow at Harvard University, where her skills in X-ray CT scanning have proved invaluable in a completely different area of evolutionary biology. “The man who is now my boss called me,” Emma recalls, “and said ‘I have a project for you. Your skills fit perfectly. Have you heard of Jurassic Park?’ It turns out that amber from the Dominican Republic gets a lot of things stuck in it, and not just insects. There’s quite a few vertebrates stuck in Dominican amber, like lizards, geckos and frogs”

Emma’s research involves studying scans of these fossilised lizards to learn about their evolution. “To suddenly see inside a piece of amber that a lizard died in 20 million years ago is amazing to me, because I’m seeing something that’s never been seen before,” she says.

The project appeals to Emma because she has a long-standing interest in anatomy, and it is her skill at CT scanning that has allowed her to work in what might otherwise seem like a rather old-fashioned field of research. “By using CT scanning I can still study anatomy, but in a new high-tech way,” she says, “because there are new things we can find out about these objects now that we can scan them.”

Emma enjoys her work for the same reasons she enjoyed her PhD: the thrill of making new scientific discoveries. “The science I like to be a part of is the blue skies science,” she explains, “I just love learning. The days when it’s great are the days when I think, ‘Wow, I’ve learned something new today.’”



A fossilised lizard in Dominican amber and X-ray CT scans of the lizard skeleton