Instructor of the Month: Chris Herd
Meet this month's Instructor of the Month, Professor Chris Herd.

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What do you teach?
I teach courses in Earth and Atmospheric Sciences, including EAS 224 (Mineralogy I), EAS 206 (Geology of the Solar System), EAS 467/567 (Planetary Geology), and EAS 333 (Advanced Geological Field School). This may seem like a diverse set of topics, but they are all unified by mineralogy, which is the study of the minerals that make up the Earth, the other solid planets and objects (like moons, asteroids and comets) in our solar system.

Minerals are awesome—not just because they represent the way that atoms arrange themselves over and over again in a regular way to make crystals large enough to see and hold in your hand, but because they are time capsules for information on the history of our solar system! That aspect is the main thrust of the Planetary Geology course (EAS 467/567), in which students can choose to carry out mini-research projects using meteorites in the University of Alberta Meteorite Collection.

In Geology of the Solar System (EAS 206), which is open to any student that has completed a 100-level or higher Science course, I put all of the planets and other objects into a broad context that involves the interaction of matter and energy over time—something of a universal concept. But because of the rapid pace of space exploration and discovery, I have to constantly update my notes as new results of the latest space mission are made available. It’s a great time to be teaching this subject.

What are some of its "real-world" applications?
There are numerous applications, but one of the most practical and important is in the exploration for resources which we need for the things we make: everything from smart phones to cars to spacecraft! And since minerals represent specific conditions of formation, we can use this information to find the most likely places where economic minerals may be found.

What’s the coolest thing about this subject area?
The connection to space, of course! My own research involves teasing out information from minerals in meteorites. Some of the meteorites formed nearly 4.6 billion years ago, at the very beginning of the solar system, while others are actual samples of Mars or the moon. So, there is the ‘cool factor’ that you can actually hold something that incredibly old in your hand. The time-capsule minerals within them provide amazing amounts of information on places to which we cannot easily go.

What kinds of unique or innovative learning experiences do you offer your students? What’s the value in offering students these opportunities?
We teach our geology students to identify minerals in rocks so that they can do what geologists do: put all that book and lab training into use in mapping rocks in the field, which is where all the action is. That alone is unique to geology. The innovative part has come about in the last three years, in which I led an effort to incorporate tablet-based mapping into EAS 333, Advanced Geological Field School. In this course, the students map an area about two km by two km outside of Cranbrook, B.C. They have traditionally mapped it using transparent (Mylar) paper on air photos—the way geologists have mapped in Canada for decades. With funds from ConocoPhillips Canada, and excellent on-campus resources, we were able to purchase new satellite imagery and topographic data; incorporate...
the new base maps into an ArcGIS Online database, along with all the symbols and tools needed to map the area; and load them onto iPad tablets for use in the field. The setup is pretty slick – the onboard GPS locates you in the field, so you don’t need a separate GPS unit, and they work without cellular data connection. Students can even take photos with the iPads, annotate them right there in the field, and tag them to specific locations on the digital map. The value in including this in the field school is that it provides students with an experience that is not commonly offered anywhere else, and which sets them up well for jobs in the Earth sciences which are increasingly using tablet-based data collection.

What was your favourite learning experience as an undergrad, and how do you incorporate that experience into teaching your students?

My favourite experience was a course I took in my fourth year at Queen’s University on the geology of North America. It was a capstone course—the kind that requires knowledge of many aspects of other courses in order to fully understand it. What I loved about it was that the geology of this continent records most of Earth history, starting at about 4 billion years ago, and I came to appreciate the view gained by looking in ‘deep time’ at the sequence of events that have affected the Earth, and which provides a context for our own influence on our planet as a species.

What is one thing that people would be surprised to know about you?

I am absolutely fascinated by the application of evolutionary concepts to our species, and the role that evolution has played in making us who we are. I am especially interested in how it is that we have come to evolved brains that can imagine whole planets, solar systems, galaxies—things that are well beyond what we can readily observe directly—and the nature of belief in a divine creator. That intersection between science and religion is of particular interest, because it incorporates more of who I am personally.

Source: Faculty of Science

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