

## TRACER GEOCHEMISTRY

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Hi. I'm Jeff Ryan. I am the professor for tracer geochemistry. This is the-- no, it's really a second year chemistry course for most of you. It assumes that you've been in our general geochemistry offering.

I am a geochemical researcher. I use geochemical tracers of various kinds to understand processes in the Earth, specifically processes associated with subduction. My most recent adventures have actually involved being out on a research vessel for two months. I was on the International Ocean Discovery Program Expedition 352, exploring the very toe-end of the overriding plate in the Izu-Bonin subduction system to try to find the very oldest volcanic rocks that were erupted in that system just as it began. And we're currently actually working on some of those samples here on campus.

What this class is really about is showing you how to use chemical tracers, both elemental abundances and isotopic tracers, to understand and track Earth processes, to take advantage of, for example, the principle of radioactive decay to understand the growth of daughter products as a way of dating rocks, dating events, and also fingerprinting different chemical reservoirs, different pieces of the Earth. But also to use trace elements as a way of tracking specific kinds of processes, for example, the interactions between waters and rocks because there are number of elements that are very sensitive to the effects of water/rock exchange. And we can actually track the amount of water, as well as where the water has gone, using some relatively straightforward strategies for looking at the abundances of these elements and comparing them to another.

So the structure of this class, you'll be doing an online component. There will be a series of online modules or problem sets that you'll work through, essentially at your own pace. These are the places where you get sort of the basics of working with elemental tracers, the kinds of graphical and mathematical strategies we use to look at this data and interpret this data.

And then there will be the live section of a class. It's won't be physically live. We'll actually be doing this virtually by teleconference or video conference. But it essentially will be a live seminar. And each of you will be responsible for presenting on a topic of interest to you.

Ultimately, what I hope will happen is when you leave this class, you'll have this rather substantial toolkit, both of elemental tracers and analytical strategies that you've heard about in the course based on your work and that of your classmates, that will leave you pretty well prepared to take on whatever geochemical problems you may find.