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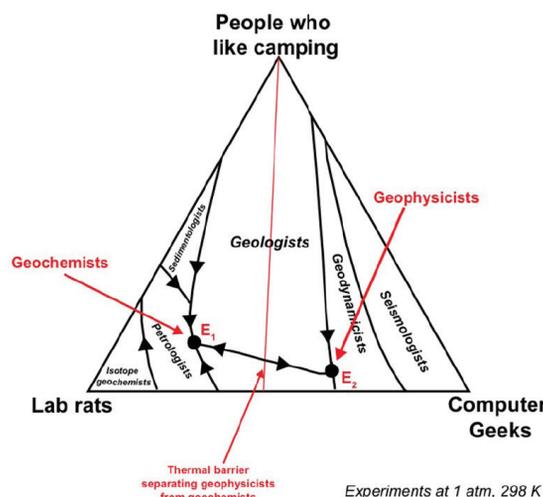
## FLUIDS AND THE FIELD

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Richard Harrison

As someone who firmly sits on the “Lab Rats–Computer Geeks” binary join of the geoscientist ternary diagram (FIG. 1), putting together this “Hydrothermal Fluids” issue of *Elements* has brought back some vivid memories of my yearly foray into field teaching. Faced with the task of explaining some complex, but fundamentally important, geological process encoded into the face of an outcrop, I would get the inevitable student question: “But why does that happen?” Invariably, my mumbled response would be, “Because of fluids....”. As pointed out – more expertly – by this issue’s guest editors Matthew Steele-MacInnis and Craig Manning, very little happens on Earth without with involvement of fluids, a fact that becomes immediately evident in the field, well away from the clean, dry and highly controlled laboratory environment that I am more comfortable inhabiting. Having finalized this issue, I am looking forward to giving much more detailed answers in the future!



**FIGURE 1** The geoscientist ternary diagram.  
CREDIT: EMILY CHIN

Despite my relative lack of field experience, these occasional confrontations with the harsh realities of “rocks in the wild” are an important reminder that, wherever you sit on the ternary diagram of geoscientists, the materials we work on – be they synthesized in the lab or simulated inside a computer – are being used to address questions that exist in a complex natural world, and that being dragged out of the lab, however briefly, provides a valuable opportunity to place our work into that broader context.

For a number of reasons, the role of field work in the geosciences has come under intense scrutiny this year. Field work has arguably been the geoscience curriculum’s greatest casualty during the global pandemic, with residential

field trips and field mapping projects cancelled or postponed, leaving universities scrambling to develop innovative alternative ways to deliver the same learning objectives at incredibly short notice. Field work, and a love of the outdoors, is cited by many as their primary inspiration for pursuing a career in the geosciences. Sadly, however, fewer students than ever are choosing that path. In the UK, for example, the number of students studying geology at university has declined by 43% since 2014. There are undoubtedly multiple reasons for this decline, but the fact that field work is often treated as an essential gateway through which all geoscientists must pass is potentially one of them. Although field work is an inspiration for many, it can present a variety of physical, financial and cultural barriers to others. Issues of accessibility for those with disabilities (both visible and invisible), widespread reports of sexual harassment (Clancy et al. 2014), and hostility towards (or criminalisation of) those in the LGBT+ community in certain field areas, all contribute to a lack of inclusivity that must be urgently addressed (Giles 2020). The financial and cultural barriers to field work experienced by those who have not had the same opportunities as others to experience the outdoors growing up, may be contributing to the lack of racial diversity in the geosciences.

From my own perspective, although I love the opportunities I have to teach in the field and renew my appreciation for the complexity of the natural world, I have somehow managed to carve out a career in geoscience without ever doing a single day of actual field work as part of my research. My “field work” has been spent at neutron sources, at synchrotrons, in electron microscopy suites, in the high-temperature laboratory and behind computer screens. Geoscientists come in a variety of flavours: we are physicists, chemists, mathematicians, biologists, computer scientists, materials scientists, oceanographers, environmental scientists, all united by our shared desire to understand how the natural world works, be that at the atomic or planetary scale. Just as people take different paths *to* the geosciences, so it is equally important that people can find their own path *through* the geosciences. So, let’s embrace field work, let’s make it inclusive, let’s embrace innovative alternatives to field work, and, yes, let’s embrace those – like myself – who just don’t like camping!

**Richard Harrison**  
Principal Editor

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