To See the World in a Grain of Sand: Utilizing detrital heavy minerals to reconstruct California's sedimentary history

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"To see a World in a Grain of Sand

And a Heaven in a Wild Flower,

Hold Infinity in the palm of your hand

And Eternity in an hour" – William Blake

Poet William Blake envisioned a world inside a grain of sand, but when these words were written in 1803 they lacked the technology to unlock the true secrets of that beautifully complex world. These sand grains hold a rich and deep story that may hold the key to reconstructing the tectonic history of California. We are becoming increasingly effective at unlocking the immense amount of information contained within a single mineral grain. These mineral grains are weathered out of rocks to become the sand of our beaches, rivers, and deserts. We call these sand grains "detrital minerals," and the heavy, or high-density, detrital minerals have been my trade for the past 14 years. I was first introduced to the power of detrital heavy minerals at Washington State University while tracking sediment deposited by catastrophic glacial floods at the end of the last ice age. I became increasingly involved in the use of a particular detrital heavy mineral, zircon. Detrital zircon is taking its place as a mineral juggernaut in the world of geology. By incorporating uranium (U) into its crystal structure, while excluding lead (Pb), zircon can be dated with a very high level of precision and accuracy utilizing the U-Pb decay system. During my presentation for the Northern California Geological Society I will focus on the use of detrital zircon geochronology to address issues within the Salinian Terrane and Franciscan Complex of Northern California. We will discuss how these ages can help reconstruct the depositional ages of these units and place constraints on their origin.

Biography: Owen Anfinson completed a B.A. in geology from the University of Minnesota, followed by an M.S. from Washington State University, and a Ph.D. from the University of Calgary in 2012. He was also a distinguished postdoctoral fellow at the Jackson School of Geoscience at The University of Texas at Austin from 2012 to 2015. He is primarily a tectonic sedimentologist, meaning that most of my research focuses on utilizing tools such as detrital geochronology and thermochronology to understand tectonic problems. My research has spanned a wide range of field areas from the Channeled Scablands of Washington to the Canadian and Russian Arctic.