

***CONSTRUCTION, EMPLACEMENT, AND STRUCTURES OF  
PLUTONS AND THEIR IMPORTANCE: INSIGHTS FROM THE  
SIERRA NEVADA BATHOLITH AND NORTH CASCADES  
(WASHINGTON)***

**Bob Miller, Department of Geology, San Jose State University**

Much insight has been gained during the last 25 years into processes operating during the construction of plutons, and the evolution of these magmatic systems at their level of emplacement. Despite these advances, numerous controversies remain, including the numbers of magmatic increments which form a pluton and the sizes of magma chambers in plutonic systems. Other questions revolve around the origin of magmatic structures (e.g., foliations) in plutons. Many of these issues have been addressed through detailed study of plutons in the Sierra Nevada arc, and particularly the Tuolumne intrusive complex in Yosemite National Park.

In this talk, I provide insights into these problems on the basis of research conducted by San Jose State faculty and students in the central part of the Sierra Nevada batholith (Desolation Wilderness south to Yosemite Valley), including the Tuolumne intrusive complex, and in the North Cascades (WA). Our observations demonstrate a wide variety of styles of construction and emplacement, which likely reflect markedly different magmatic systems. These differences in part record differences in exposed crustal levels between the North Cascades (~30-5 km paleodepth) and the central Sierra Nevada batholith (~10 km paleodepth).

**Biography:** **Dr. Robert Miller** reports that he is a Professor and Chair of Geology at San Jose State where he has taught structural geology, tectonics, and field camp for 31 years. He received his B.S. degree in Geology from Allegheny College (Pennsylvania) and his Ph.D. from the University of Washington in 1980. His research has largely focused on the tectonic evolution of the North Cascades and the structure of plutons in the Sierra Nevada and Cascades. His Ph.D. was on an ophiolite in the Cascades and he has worked on and off on ophiolites since then, including in Oman.