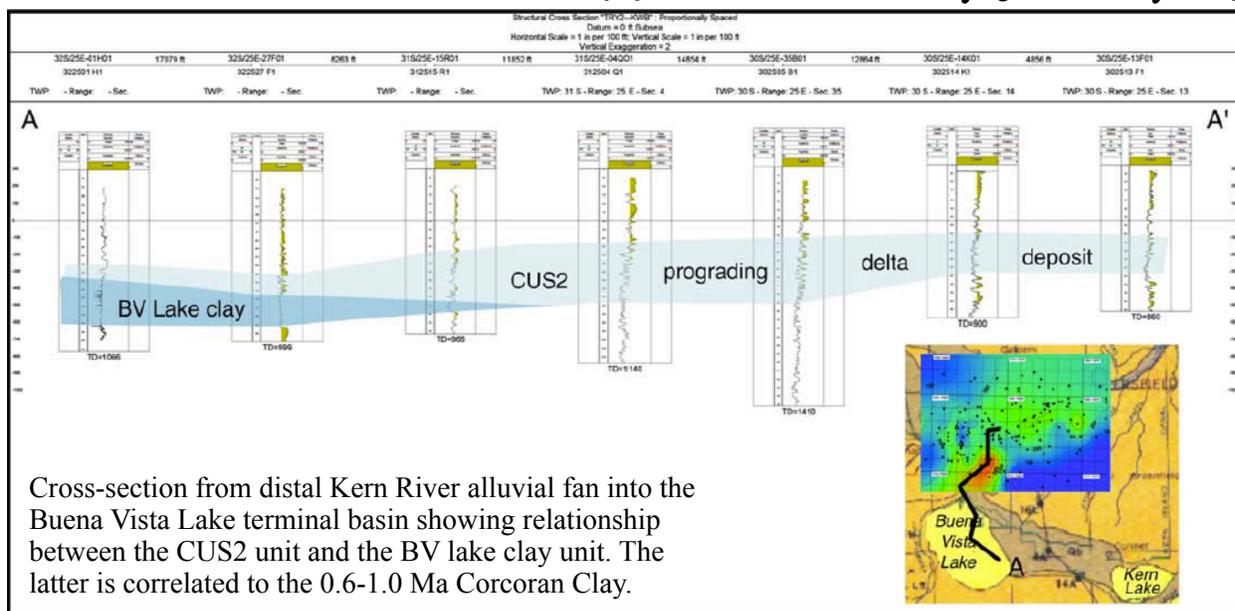


McLane Hall room 121 4-5 PM Thursday, January 24



## A MIDDLE PLEISTOCENE LACUSTRINE DELTA UNDERNEATH THE MODERN KERN RIVER ALLUVIAL FAN: STRUCTURAL CONTROL, REGIONAL STRATIGRAPHIC CONTEXT, AND IMPACT ON GROUNDWATER QUALITY

**Dr. Rob Negrini** holds a B.A. from Amherst College and a Ph.D. from U.C. Davis. He is currently Professor of Geology at CSU Bakersfield where he teaches both in the geosciences as well as physics, and has been honored as an outstanding professor. His research program includes North American paleoclimate and paleomagnetism as revealed in pluvial lake sediments, shallow subsurface geophysics applied to hydro-geological and environmental problems, and application of geophysics to structural and tectonic studies.



A 200- to 400-ft-thick coarsening-upward sequence of sediments was mapped at depths of 300 to 700 fbs under the western margin of the Kern River alluvial fan in the southern San Joaquin Valley of California. Sedimentary petrography and x-ray diffractometry of samples from wells containing this unit indicate a predominantly Sierran source for the clastic component of the sediments. The basal part of this unit is typically fine grained (clays and silts) and grades upward into medium sands. The unit thickens toward the Buena Vista Lake terminal basin and is interpreted to have been deposited as a lacustrine delta as part of an alluvial fan-delta system that prograded into its terminal basin. Relatively high amounts of organic carbon and extremely low magnetic susceptibility suggest that the unit was deposited under reducing geochemical conditions. Authigenic euhedral and framboidal pyrite crystals indicate that reducing conditions progressed to the sulfate reduction stage.

The coarsening-upward sequence is thickest in a rectangular, prism-shaped trough bounded by the surface projection of normal faults that were previously mapped in deeper sedimentary units. This observation suggests that the deposition of this unit was at least in part structurally controlled. Basinward, the unit laps onto or grades into a thick depocenter clay layer tentatively correlated to the Corcoran Clay that was deposited in a valley-wide lake prior to 600,000 years ago.

In the Kern Water Bank area, the thickest part of the coarsening-upward unit lies in the same region as a set of wells with anomalously high concentrations of groundwater arsenic. Relatively high concentrations of easily-exchangeable arsenic were found in samples from a well within the coarsening-upward unit. These observations suggest that, in the reducing lacustrine setting of this unit, arsenic was locked up in pyrite reservoirs. Dissolution textures observed in pyrite crystals under a scanning electron microscope suggest a post-depositional transition to more oxidizing conditions and the subsequent release of arsenic into solution in groundwater and in easily-exchangeable sites on mineral surfaces.