

# Inland Geological Society

June 2012

Newsletter of the Inland Geological Society

Volume 28 No. 6

***This Meeting:***  
**Wednesday,**  
**June 6<sup>th</sup>**

**Time:**  
Social: 6:00pm  
Dinner: 6:30pm  
Lecture: 7:00pm

**Location:**  
**LSA Associates**  
**1500 Iowa Ave**  
**Suite 200**  
**Riverside, CA**  
**92507**  
(Map on Pg. 5)

**Coming to**  
**Dinner?**  
**Please RSVP:**  
**By Monday 6/4**  
**(951) 784-2168**  
**dixie.lass@att.net**

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## **June Speaker:**

**Mr. Frank Jordan, PG, CEG, CHG**  
**Geology Department Lead, John R. Byerly, Inc.**

## **Geomorphic Evolution of Morongo Valley**

### *Abstracts*

The Morongo Valley appears to represent a classic graben bounded by normal faults. The geomorphology of the valley represents a northeast-trending (N55E), downdropped basin flanked on the northwest by the San Bernardino Mountains and on the southeast by the Little San Bernardino Mountains. The southwest terminus of the basin is truncated by a northwest-trending ridge. The northeast terminus of the basin is anchored to the southeast corner of the Mojave Desert. The northeast trend of the valley is almost perpendicular to the northwest strike of the Mission Creek Branch of the San Andreas fault.

The geology and faulting of the Morongo Valley have been previously mapped by Dibblee (1967, 1968), Ehlig (1977), Farley (1979), Marcus (1982), Grimes (1986, 1987), Rasmussen and Reeder (1986), Reeder and Rasmussen (1986), Matti *et al.* (1982a, 1982b, 1985, 1992), Jennings (1974, 1977, 1992, 1994), Jennings *et al.* (2010), Jennings and Bryant (2010), Bryant (2005), Rogers (1967), Bortugno and Spittler (1986), Morton and Miller (2003a, 2003b, 2006) and Ziony and Jones (1989).

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The Pinto Mountain fault has been mapped as the bounding fault along the northwest edge of the valley. East of Morongo Valley, the Pinto Mountain fault strikes east to Twentynine Palms. At the northeast end of the valley, the fault changes strike to approximately N65W. Midway along the valley, the fault is mapped as within the foothills, striking more westerly. The fault is mapped as truncated by the Mission Creek Branch of the San Andreas fault. The Morongo Valley fault is mapped as the bounding fault along the southeast margin of the valley. The Morongo Valley fault strikes about N55W, parallel to the valley itself. Grimes (1987) mapped the fault as extending into the eastern portion of Yucca Valley. The State of California recognized both faults as potentially active faults and included traces of the faults within Alquist-Priolo Earthquake Fault Zones (California Division of Mines and Geology, 1974a, 1974b, 1988a, 1988b, 2003).

At the Rockaway Avenue water tank stop, the mapped trace of the Morongo Valley fault is located about 1,000 feet (300 meters) south of the stop, along the southeast edge of Highway 62 and the toe of northwest-facing slope of the Little San Bernardino's (Bryant, 2005; USGS, 2002, 2008). The mapped traces of the main Pinto Mountain fault are located about 2,000 feet (600 meters) northwest of the stop, running along the toe of southeast-facing slope of the Big San Bernardino's (Bryant, 2005; USGS, 2002, 2008). The USGS and CGS disagree over the actual location of the main trace of the fault in this area. Both agree, though, that a branch of the fault is located approximately 1,250 feet (380 meters) east of the tank, crossing through the housing tract east of the tank, near the intersection of Rockaway Avenue and Whitney Avenue. Both this splay of the Pinto Mountain fault and the Morongo Valley fault are included within Alquist-Priolo Earthquake Fault Zones by CGS (California Division of Mines and Geology, 1974a, 1988b, 2003). Curiously, the main trace of the Pinto Mountain fault north of the site, as mapped by CGS, is not included within an A-P Zone. In addition to the three mapped faults, review of digital aerial photography available through Google Earth, Microsoft's Bing 3D, and NASA's World Wind suggest that additional splays of the Pinto Mountain fault bracket both the north and south sides of the water tank. An additional branch of the Morongo Valley fault is also identifiable running along the northwest side of Highway 62. Several northwest-trending lineaments suggest that branches of northwest-striking faulting pass up the canyon just west of the water tank, as well as just east of Rockaway Avenue. These northwest-striking faults appear to be part of a larger Helendale-Pipes Canyon fault zone. The southern end of the Pipes Canyon fault is coincident with the canyon about 2¾ miles (4.4 kilometers) down Morongo Grade from the water tank. In addition to the faulting, large, deep-seated landslides bracket both sides of the valley, forming the flanks of both the Little and Big San Bernardino Mountains. These landslides, as well as numerous failures within Morongo, Big Morongo, Little Morongo, and Dry Morongo Canyons provide the source materials for the countless debris flows that make up the alluvial fans emanating from the Big San Bernardino Mountains. The four major drainages within the valley uncharacteristically cross the valley floor perpendicular to its long axis, rather than flowing along

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the long axis to the topographical low point at the southern end of the valley. These four drainages are antecedent to formation of the valley. At one point, they all necessarily flowed across the old geomorphic surface etched on top of the ridges both northwest and southeast of the basin. Flow within these drainages has been sufficient to incise the surrounding mountains and maintain flow paths through the Little San Bernardino Mountains to their debouchments at Desert Hot Springs. The reduction in flow rates of these drainages expected during the Holocene epoch suggests that the slip rate along the Morongo Valley fault is very small, otherwise, the stream flows would have been trapped within the valley and forced to flow southwestward. Renewed uplift of the Big San Bernardino Mountains is considered to have coincided with formation of the San Geronio structural knot in the San Andreas fault and movement associated with inception of the San Jacinto fault (Morton and Matti, 1993). The geomorphology of the Morongo Valley suggests that, while the northwest-dipping Morongo Valley fault accommodates most of the normal-sense of offset along the southeast side of the valley, the Pinto Mountain fault, as currently mapped, does not accommodate most of the normal movement along the north side of the valley. A previously unrecognized southeast-dipping branch of the Morongo Valley fault is expected to accommodate normal movement along most of the northwest edge of the valley. The Pinto Mountain fault, as observed on the digital aerial photography, continues out of Yucca Valley and on to the west, eventually intersecting with the Mill Creek branch of the San Andreas fault. The semi-circular fault consistently mapped as the western-most portion of the Pinto Mountain fault appears to be a separate, normal fault that probably developed in response to gravitational stresses induced by the incipient, tensional pull-apart of the Morongo Basin. The symmetry of the valley suggests that the slip rates along the southern and northern branches of the Morongo Valley fault zone are similar, probably on the order of 0.5 millimeter per year.

### ***Biography:***

**Mr. Frank Jordan** graduated from Pasadena City College with an Associates of Arts degree in Natural Science in 1980 and California State University, Los Angeles with a Bachelor of Science degree in geology in 1983. Between 1983 and 2003, Frank pursued a course of graduate studies in engineering geology at CSULA. Frank received his California Professional Geologist's license in 1994. Frank added a California Certified Engineering Geologist's license in 1995 and added a California Certified Hydrogeologist's license in 1996. Under the building code in effect at that time, Engineering Geology certification allowed Frank to accept responsibility for natural and cut evaluations, and to identify and work on mitigation of failed slopes. The Hydrogeology certification permitted him to address the groundwater conditions of slopes and landslide, as well as flat lands.

In 2007, Frank was recruited to reconstitute and lead the Geology Department at John R. Byerly, Inc. As the head of the department, Frank has had the pleasure of supervising a crew of 2 to 3 staff, senior staff, and licensed geologists, covering landsliding, faulting, seismic shaking, liquefaction, lateral spreading, groundwater, and hydrogeology studies.

## Upcoming Meetings/Events

### Rock & Gem Shows—Various locations

Various rock and mineral shows will be throughout So. California. To find one near you, visit [www.rockngem.com/showdates.asp](http://www.rockngem.com/showdates.asp)

### South Coast Geological Society / San Diego Assoc. of Geologists Joint Meeting



visit [www.southcoastgeo.org](http://www.southcoastgeo.org)

Mike Hart, engineering geologist, will be presenting a talk on "When Landslides are Misinterpreted as Fault—Or—Your Fault is My Landslide (Sometimes)" on **Wednesday, May 13, 2012** at the El Adobe in San Juan Capistrano, CA. For more info.,

### REG REVIEW, Inc.—ASBOG Study Course

Are you taking the CEG or CHG exam in Fall 2012? REG REVIEW, Inc. will be offering a study course for the CEG and CHG exams on **Saturday, June 19, 2012**. The courses will be offered at the Best Western Orange County Airport North in Santa Ana, CA. For more info., visit [www.regreview.com/](http://www.regreview.com/)

### AEG—Inland Empire Section Field Trip



AEG-Inland Empire Section will be having a field trip on the "Landslide Field Trip to the San Bernardino Mountains". The field trip will be on **Saturday, June 9, 2012**. For more info, visit [www.aegsc.org](http://www.aegsc.org)



## IGS Meeting Schedule

### **July 12, 2012 (Thursday)**

TBA

### **August 1, 2012 (Wednesday)**

Thom Deane, Deane Consulting  
*The Surface Water Outflow from the Orange Crest/Mission Grove (OCMGA) Area of Riverside, CA*

### **September 6, 2012 (Thursday)**

Mr. Austin Marshall, Mitsubishi Cement Corp.  
TBA

### **October 3, 2012 (Wednesday)**

TBA

### **November 1, 2012 (Thursday)**

TBA

## STUDENTS

**Are you graduating this year?  
Or maybe you have been  
working on a research project?**

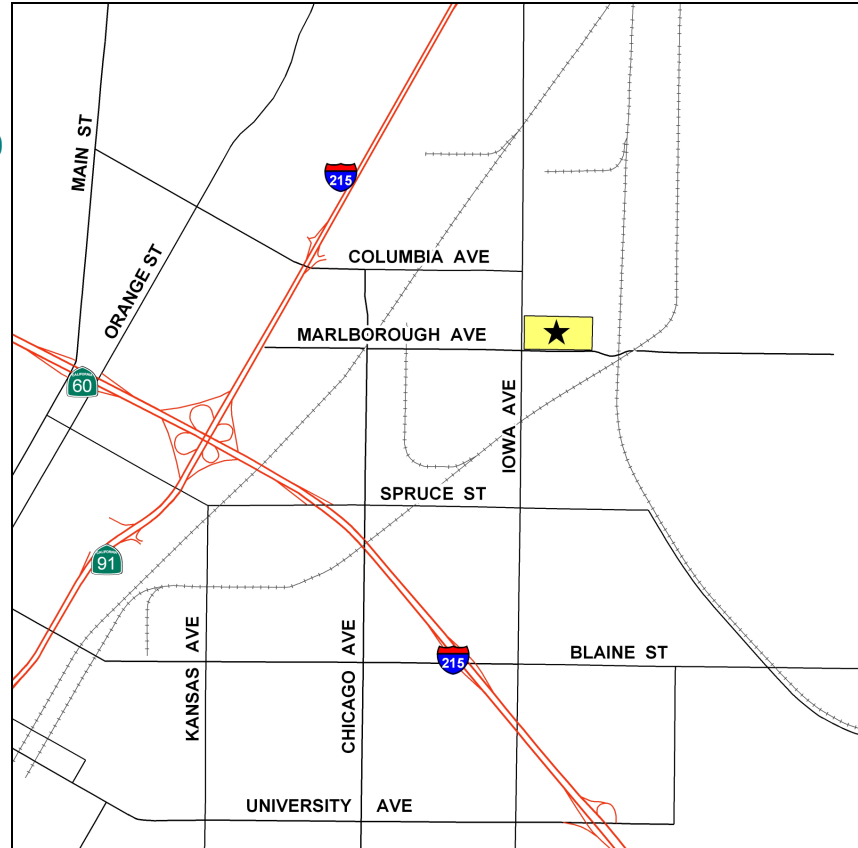
**Do you want to practice your  
presentation before your  
defense? Are you looking to  
meet your future employer?**

**Presenting your research at  
an upcoming IGS meeting!**

**Contact Jon Smith, Debbie  
Kunath or Steve Mains to  
get your name in the schedule!**

**IGS MEETING LOCATION:**

**LSA Associates, Inc.**  
**1500 Iowa Ave, Suite 200**  
**Riverside, CA 92507**

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