

**The Cal Poly Pomona Geology Club presents:  
The 2009-2010 Geology Speaker Series**



**Paul Marinos –  
2010 Jahns Distinguished Lecturer**

**Geology in dam engineering: An evolving  
contribution of Engineering Geology for  
safety and efficiency**

**Tuesday, March 2, 2010**

**12:00-1:00PM**

**Building 24D, Room 1220**

*(see attached map for directions)*

## Abstract:

*“To avoid the shortcomings associated with present practice requires first of all expert translation of the findings of the geologist into physical and mechanical terms. Next it requires the evaluation of the existing geologic conditions; and finally to assume for the design of the structure the most unfavourable possibilities. These mental operations represent by far the most important, most difficult, and most neglected tasks in the field of dam foundations” (Terzaghi, 1929)*

This statement can be repeated today but the phrase “most neglected” is no longer true. Indeed developments are impressive with a sound understanding from all parties on the significance of knowledge of the geological conditions and the ground properties and behaviour.

Dams are among the civil engineering structures with the greater interaction with the ground and environment, increasing the responsibility of Engineering Geologists to translate geological findings into engineering design input. The lecture will consider all aspects of the involvement of engineering geology for both the site of the dam and the area of its reservoir.

For the site the information required refers to the quality of the foundation, the stability of the abutments, the watertightness of the foundation and ridges, the stability of the area of appurtenant structures, the specification of geological hazards and the reconnaissance for appropriate construction material.

The selection of the appropriate dam type is a vital decision. The function of each of the dam types and the significance of the geological conditions for such decisions is discussed. Past dam failures, mostly due to neglect, ignorance or underestimation of geological features are always excellent in terms of lessons learned. A review is given of the causes of dam failures, from data of the International Commission of Large Dams, with discussion of some major failures around the world.

The geology of each dam site is unique. Even if it looks identical to another site, there will be differences in geological detail and, quoting again from Terzaghi, “*minor details constitute elements of major significance*”. In this context the features and particularities of most common rocks are presented together with the variety of the elements of the structure a site may present, illustrated by case histories.

The assessment of permeability of the site and the criteria for the need of a grout and/or drainage curtain constitute an important chapter for the engineering geologist in site investigation, design and construction.

For the reservoir area the scale of consideration is totally different and regional hydrogeologic understanding is essential. A number of cases are presented with an emphasis on the existence of old river beds in different location and on karstic carbonate rocks. Instability of the mountain slopes around the reservoir may lead to disasters and important case histories are presented together with the countermeasures that can be undertaken.

## Bibliography:

Dr Paul Marinos has been named the 2010 Jahns Distinguished Lecturer. The Association of Environmental & Engineering Geologists (AEG) and the Engineering Geology Division of the Geological Society of America (GSA) jointly established the Richard H. Jahns Distinguished

Lectureship in 1988 to commemorate Jahns and to promote student awareness of engineering geology through a series of lectures offered at various locations around the country. Richard H. Jahns (1915 – 1983) was an engineering geologist who had a diverse and distinguished career in academia, consulting and government.

Dr Paul Marinos received a Mining Engineering degree from the School of Mines of the National Technical University of Athens, Greece in 1966, a postgraduate degree in Applied Geology from the University of Grenoble, France, and his Doctorate in Engineering Geology from the same University in 1969. He worked for French and Greek design and construction companies until 1977 and then was elected as Professor at Democritus University in Northern Greece. Since 1988 Dr Marinos has been Professor of Engineering Geology in the School of Civil Engineering in the National Technical University of Athens and has served as head of the Geotechnical Section of the School for several years. From 2001 to 2004 and from 2006 to 2008 he was the Director of a Graduate Course in Tunneling and Underground Construction. He was a visiting Professor in the Geology Department of the University of Grenoble (1987) and of the School of Mines in Paris (2003).

Dr Marinos is a member of AEG and GSA and fellow of the Geological Society of London. He is a past President of the International Association of Engineering Geology and the Environment (IAEG), immediate past president of the Geological Society of Greece and honorary member of the International Association of Hydrogeologists (IAH).

Dr Paul Marinos has received several awards, including the Hans Cloos medal of IAEG, and the Andre Dumont medal of the Geological Society of Belgium. He was selected for the presentation of named lectures, including the 6<sup>th</sup> Glossop Lecture in London (2002), the 19<sup>th</sup> Rocha Lecture in Lisbon (2002), the 33<sup>rd</sup> Cross Canada Lectures Tour (2005), and the Rock Mechanics annual Lecture in Madrid (2006).

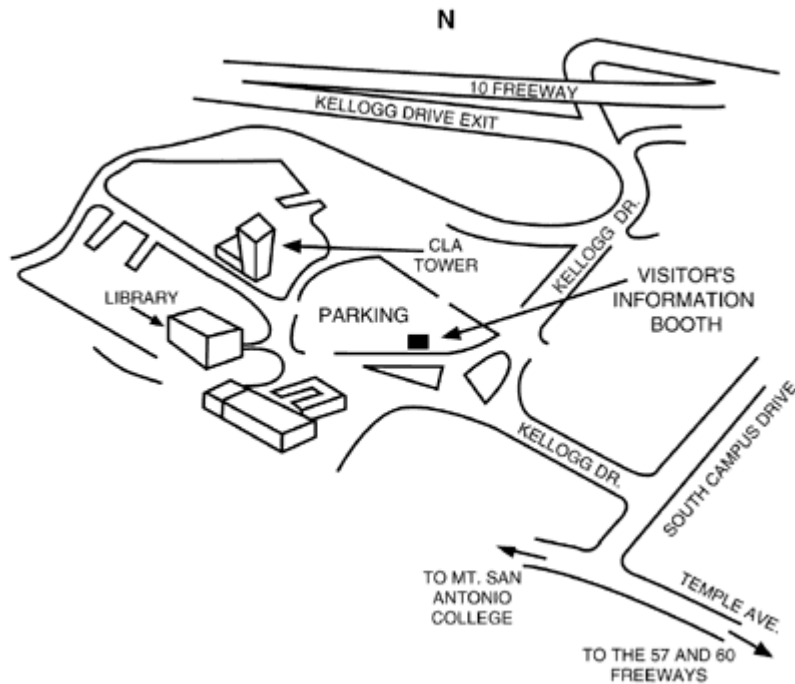
Dr Marinos and his team conduct research on a variety of applications of geology to engineering, mainly rock mass characterization, weak rock properties and behavior, with special emphasis to tunnel design. His work also covers landslides, dam geology, and engineering in karstic terrain. His other significant interest is the protection of historic monuments and archeological sites. Dr Marinos has authored or co-authored over 300 papers in journals or major conference proceedings. He was a key or invited lecturer in more than 40 conferences or special events. He has given lectures to University Courses or Workshops, among them the Federal Technical University (EPFL) in Lausanne, Switzerland, the Polytechnico of Turin, Italy, the University of Durham, U.K., the University of Coimbra, Portugal, the University of Kobe, Japan, the Black Sea University Romania, the Aristotle University of Thessalonica, Greece, and the Griffiths University, Australia. He has edited proceedings published by international publishers. Dr Marinos is a member of the Editorial Board of a number of prominent journals as "Engineering Geology", "Bulletin of the International Association of Geology", "Landslides", "Environmental Geology", "Rock Mechanics" and from 2009 "Environmental and Engineering Geosciences".

Dr Paul Marinos has extensive industrial experience having served as consultant, independent reviewer and member of consulting boards or panel of experts on major civil engineering projects in Greece, France, India, Iran, Jordan, Morocco, Portugal, Saudi Arabia, South East Asia, Spain, Sweden, and Turkey.



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## Driving Directions to Cal Poly Pomona



### From Los Angeles:

Take the 10 freeway EAST and exit at Kellogg Drive.

### From Orange County:

Take the 57 freeway NORTH to Temple Avenue and exit north (left-hand turn) to the campus.

### From The Inland Empire:

Take the 10 freeway WEST and exit at Kellogg Drive.

### From the Pasadena area:

Take the 210 freeway EAST to 57 Freeway SOUTH. Exit on Temple Avenue and turn north (right-hand turn) to the campus.



