



## UC Berkeley Geosystems Group Wednesday Lecture Series

Wednesday, September 13, 2023

12:10 – 1:00 PM

Lecture Room: 406 Davis Hall

### **SUBSURFACE VARIATIONS AND ANOMALIES** *The Joys of Research, Collaboration, and 3-Dimensional Thinking*

**Wayne Magnusen, A3GEO**

This presentation focuses on the Integrative Genomics Building (IGB), a new \$150 Million scientific facility located within a former canyon in the Berkeley Hills. The nearly-level IGB site is on a cut/fill pad created about 75 years ago in a landslide-prone area with shallow groundwater. Multiple cut slopes at the upslope perimeter of the IGB site failed during grading followed by the activation or re-activation of much larger deep landslide almost 25 years later. More recently, the large and massive structures that previously occupied the IGB site were demolished, but the reinforced concrete piers and caissons that supported them were left in-place below the ground.

This presentation discusses the investigations performed to characterize site conditions and prepare the project geotechnical and geologic hazard study report for the IGB. Data from a wide variety of sources were synthesized to develop the initial 3-D geologic model used during proposal preparation. Targeted



borings were used to fill data gaps and develop the working 3-D geologic model used to analyze slope stability and estimate earthquake-induced landslide displacements. Data from new and existing borings in and around the IGB site were supplemented by data from reports and plans to map an interpreted rock surface for foundation design purposes. Research was also performed to characterize existing buried obstructions for design purposes as well as to protect against changed condition claims. Importantly, this presentation will acknowledge the collaborative inputs received from engineering geologists, structural

engineers, contractors, and the project owner. A particular challenge of the IGB investigation was visualize 3-D complexity and communicate it in 2-D deliverables. Engineered graphics prepared for this 2018 study were limited to 2-D maps and cross sections. Until the state of the practice changes, considerable judgment will be required in developing 2-D deliverables that usefully communicate 3-D complexity to owners, architects, engineers, contractors, and reviewers.

Wayne Magnusen is a California-registered civil and geotechnical engineer and serves as a vice president and principal engineer in A3GEO's Berkeley office. He has over 30 years of experience in the planning, design, and construction of campus buildings and infrastructure. He graduated from UC Berkeley with a bachelor's degree in civil engineering in 1983 and a master's degree in geotechnical engineering in 1988.