

UCA and Center of UC&T

# Student Research Presentations

WEDNESDAY, August 27th at NOON in BB W210  
- Lunch Provided -



**Richard Bearce – PhD,  
Civil**  
rbearce@mines.edu

**Topic: Development of a Prototype Electrical Push Probe to Estimate Jet Grout Column Geometry**

Jet grouting is an in-situ ground improvement technique that creates columns of grouted soil in the subsurface. These columns have numerous applications, but in the UC&T setting are often used to create inlet/outlet shafts for tunnel boring machines (TBMs) and can stabilize weak/fractured ground prior to TBM passage. Successful implementation of jet grouting requires that the resulting columns have a precisely known geometry, but current industry techniques are either too costly/time consuming or cannot provide adequate measurement accuracy. Ongoing research at CSM is developing a prototype direct push probe and measurement protocol to more accurately estimate the geometry of jet grouted columns using direct current (DC) electrical resistivity.



**Jacob Grasmick - PhD  
Civil**  
jgrasmic@mines.edu

**Topic: Instrumentation, monitoring and analysis of slurry shield TBM data and ground deformation during the construction of the four East Side Access Queens bored tunnels.**

This presentation will summarize the tunnel boring machine (TBM), ground and rail deformation data collected during the East Side Access Queens bored tunnel construction site. Four closely spaced 6.9 meter diameter tunnels were constructed under the Sunnyside rail yard in Queens, NY during which trains remained in service throughout the duration of the project. Two fully instrumented slurry shield pressurized face TBMs were used in efforts to tightly control ground deformation, which was extensively monitored with deformation sensors including classical man-survey, automated total stations, multi-point borehole extensometers and inclinometers. Research efforts are currently underway to relate key monitored TBM data (e.g. slurry pressures, slurry densities and flow rates, grout pressures and grout takes, torque, thrust and advance rate) to the observed ground deformation of the four tunnel sequence.



**Lisa Mori – PhD,  
Mining**  
lmori@mines.edu

**Topic: Development of a lab and in-situ test plan for foam-conditioned soil muck to optimize EPB TBM performance**

Understanding the influence of soil conditioning parameters on soil behavior is critical to effective EPB TBM face support and performance. A mobile field lab has been developed to conduct various tests on conditioned muck sampled off the conveyor belt. The measured conditioned soil properties and behavior in relation to the observed EPM TBM performance (cutterhead torque, face pressure, thrust, etc.) will be used to optimize the soil conditioning parameters during mining. Additional tests are performed in a CSM lab to investigate the influence of key soil properties (grain size distribution, plasticity) on the conditioned soil behavior under pressure.

Questions? Dig in with us at [uct.mines.edu](http://uct.mines.edu) or contact us [uct@mines.edu](mailto:uct@mines.edu) or contact the UCA student chapter [lmori@mines.edu](mailto:lmori@mines.edu)

