

**Geomechanics Engineer**

**Expertise** Mechanical Engineering, Engineering Systems, Materials Science, Geothermal Engineering, Renewable Energy

**Education** Ph.D. (Engineering Systems, Mechanical Specialty), 2011  
Colorado School of Mines  
M.Sc. (Renewable Energy Science, Geothermal), 2010  
University of Iceland / University of Akureyri (Iceland)  
B.S. (Mechanical Engineering), 2005  
Monterrey Institute of Technology and Higher Education, Mexico

**Honors** Best Presentation Award for “Numerical Modeling of the Nucleation Conditions of Petal-Centerline Fractures below a Borehole Floor,” 2010 Geothermal Resources Council Annual Meeting  
School for Renewable Energy Science Scholarship 2009-2010

**Professional Affiliations** Member: American Society of Mechanical Engineers

**Professional Experience**

2011 - Present *Itasca Consulting Group, Inc., Minneapolis, Minnesota*  
*Geomechanics Engineer*

2010 - 2011 *National Renewable Energy Laboratory, Golden, Colorado*  
*Intern*

2005 - 2011 *Colorado School of Mines*  
*Research Assistant*

May - December 2008 *Teaching Assistant*

2002 - 2004 *Monterrey Institute of Technology and Higher Education, Mexico*  
*Teaching Assistant / Director, ProEngineer CAD Laboratory*

**Project Experience**

*Stress Concentration and Fracture Mechanics of Hollow Glass Microspheres:* Developed an experimental test method to compress hollow glass microspheres uniaxially using a nano indentation device to characterize their mechanical behavior. Developed an FEM model to capture the stress distribution during the uniaxial compression of hollow glass microspheres and benchmarked it against experimental results. Performed fracture mechanics analyses and numerical modeling of stress intensity factors on microspheres containing a pre-defined crack at different positions.

*Geothermal Potential Evaluation:* Performed geophysical field measurements (resistivity and self potential), literature review and geochemistry water sampling in Rico, Colorado to assess its geothermal potential.

*Rotary-Vibratory Drilling:* Developed a DEM numerical model of rotary-vibratory drilling through different formations to aid in process automation and cost reduction.

*Analysis of the Nucleation Condition of Petal-Centerline Fractures below a Borehole Floor:* Developed a numerical model using BEM to determine the concentration of tensile stresses below a borehole floor at different inclinations and inclination directions sufficient to nucleate petal-centerline fractures. The models were constructed as an application to the Coso Geothermal Field in California. The results proved that petal-centerline fractures can be used to aid constrain the stress state.

*Pneumatic Excavation Mechanism for Lunar Resource Utilization:* Developed a fluid-DEM coupled numerical model to determine the conditions under which jet-lifting of lunar regolith could be achieved at variable gravitational fields.

*Lunar Regolith Handling and Sample Processing:* Developed a DEM model to study the fluidization of lunar regolith at different vibration parameters for processing purposes.