Matthew D. Purvance ITASCA

Software Engineering, Numerical Methods, Seismic Hazard Analysis

Expertise	Scientific Computing and Software Design/Implementation, Numerical Modeling of Earthquake Ruptures, Seismic Hazard Analysis
Education	Ph.D. (Geophysics), 2005 B.Sc. (Mathematics), 2000 University of Nevada, Reno

Professional Experience

2008 - Present	*Itasca Consulting Group, Inc., Minneapolis, Minnesota* *Software Engineer*
	University of Nevada, Reno,
2009 - Present	*Letter of Appointment*
2007 – Present	*Assistant Research Professor*
2005 – 2007	*Postdoctoral Scholar*

Project Experience: Design/implementation of efficient spatial searching in the Itasca framework, design/implementation of triangular faceted wall module for *PFC5.0*, design/implementation of discrete fracture network module for *PFC5.0*, design/implementation of lattice module for *PFC5.0*, implementation of fluid flow logic in Itasca hydraulic fracturing simulator, simulation of dynamic ruptures along rough interfaces using the *Particle Flow Code (PFC)*, study of percolation of fines through granular assemblages using the *Particle Flow Code in 3D (PFC3D)*, fragility estimation for fragile geological features using the *Universal Distinct Element Code (UDEC)*.

Research: Efficient numerical methods for the simulation of discrete physical systems, efficient spatial searching methodologies, framework software design, coupling of discrete/continuum numerical modeling techniques, interface dynamics, theoretical contact mechanics, computational representations and methodologies in contact mechanics, cellular automata models of elastic materials (e.g., wave propagation, fracture, spalling, etc.), micromechanical modeling of complex materials, elastic lattice modeling of solids, distinct element modeling, application of precariously balanced rock data to constrain seismic hazards and earthquake source physics, seismic hazard analysis.