Automation has regularly been identified as a technology lever that the mining industry can use to alter its cost and productivity structures. A frontier problem in mining automation is the ability for machines to plan and execute their work with minimal human oversight.

This ability to produce a plan to complete tasks which are defined by a high level description is called mission planning. This thesis considers the problem of developing optimal mission plans for autonomous surface mining excavators.

In his presentation, Peter Beasley will outline the development of mission planning algorithms for surface mining excavators. The mission planning problem for excavators is to find the most efficient digging sequence to remove identified blocks of material. The solution involves finding the answers to 'When to move?', 'Where to move?' and 'What to dig?'. This set of three questions is called the Tactical Movement Problem or TMP.

With the support of UQ Smart Machine Group, CRC Mining and APA Scholarship, Peter Beasley has developed two algorithms to solve different forms of the TMP.

These two algorithms are based on a linear programming relaxation and multi-resolution approach which are compared to optimal and greedy solution methods to determine their relative capability.