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Research interests include:

- **Nonlinear Programming**
- **Operations Research**
- **Financial Optimization**

On-going GRF project

Generalized Polyhedral Theory with Applications

Background of research:

Polyhedral theory has been well established in the literature and has applications not only in optimization but also in many other mathematics fields. Due to fixed charges and the integral nature of decision variables in real world applications, generalized/non-closed polyhedral and discontinuous piecewise linear structures have been used in various problem formulations. Multi-criteria piecewise linear program is one, in which the objective function is a piecewise linear function, not necessarily continuous, and the constraint is a polyhedral set constraint. In particular, bi-criteria piecewise linear programs have specific applications to mean-variance analysis in financial engineering, cost-benefit analysis in management science and time-delay analysis in transportation science.

Project objectives include:

- To develop a generalized polyhedral theory.
- To design objective space algorithms for finding the (weak) Pareto point set of the continuous bi-criteria piecewise linear program and the discontinuous one respectively.
- To apply the bi-criteria discontinuous piecewise linear program algorithm for solving portfolio linear optimization problems with transaction costs.