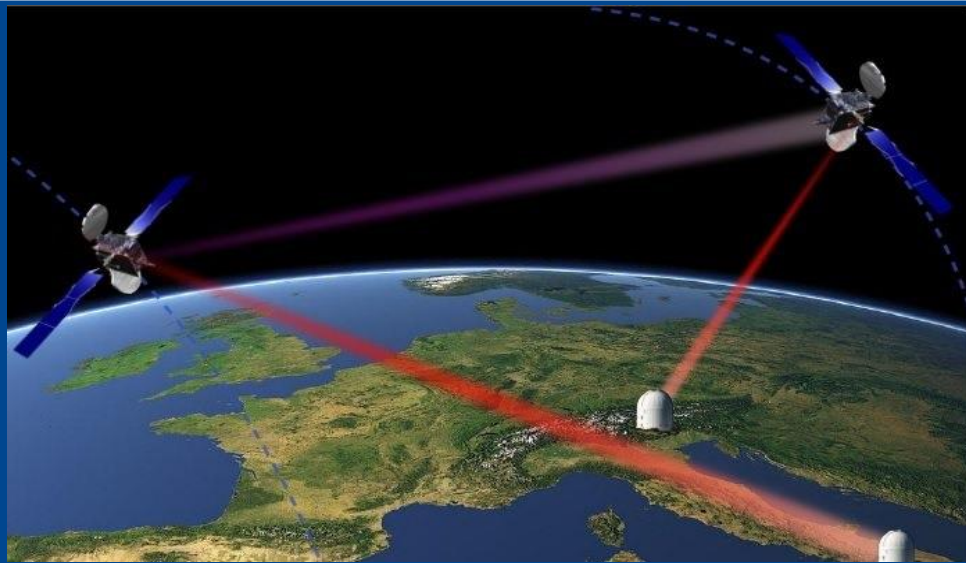# Milad Moghassem Hamidi

Department: *Electrical & Computer Engineering*

Dissertation Title: A Game Theoretic Approach for Optimization of Inter-Satellite Communication in Small Satellite Networks

Major Professor: Dr. William W. Edmonson

RESEARCH QUESTIONS / PROBLEMS:

- Considering the limited power resources of small satellites, power allocation is one of the major problems in small satellites networks.
- Power allocation problem in a cluster of small satellites has been discussed from the slave satellites point of view; but developing a reliable power allocation from both slave satellites and network point of view has not been addressed.

METHODS:

- A game-theoretic power optimization technique to study the power allocation in a network of small satellites is proposed.

RESULTS / FINDINGS:

- The proposed Stackelberg game model, maximized the throughput of network while the profligate behavior of small satellites in choosing higher levels of transmission power was controlled.
- The proof of existence and uniqueness of the solution was provided and found for systems of small satellites of different sizes.

SIGNIFICANCE / IMPLICATIONS:

- The proposed algorithm is scalable to changes in network size and can be used in bigger sizes of networks/swarms of small satellites.