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*2004 Program
New Investigator (3-year project)*

Project Title: Optimization of Proton Therapy Treatment Planning

Project Summary: Cigarette smoking is known to cause more than 87 percent of lung cancer deaths and known to be responsible for most cancers of the larynx, oral cavity, esophagus, and bladder. The effectiveness of radiation therapy in curing or controlling cancer is typically limited by the radiation damage of healthy tissues. Thus, the preservation of healthy tissues, and hence the quality of a patient's life, must be balanced against the probability of the elimination of the patient's disease. Proton therapy is the most precise form of radiation treatment available. Proton therapy can produce dose distributions that are superior to those previously attainable using conventional radiation therapy techniques. It has the greatest potential to be confined to only regions of disease in the patient. The most successful implementation of this delivery technique requires a large-scale optimization of proton beam intensities and energies for each individual patient. This project is designed to study the best approaches to optimization in proton therapy.