**Antenna Design for Millimeter Wave Systems**

Future generations of wireless technologies will be implemented in the mmWave band. Using higher frequencies requires new approaches to antenna design that implement MIMO and phased arrays, ultimately allowing for beamforming and beamsteering. The question of efficient recombination of phased array components in real time has not yet been fully studied -- further, proper algorithms to solve this problem (especially at specific frequencies) have not been fully developed. The aim of this project is to study the ways in which the problem can be redefined/reduced to a problem of linear algebra and to develop non-naive "smart" ways to perform efficient azimuthal angular analyses that can make use of language and architecture specific methods.

The project includes creation of a software "channel simulator", development of frequency-independent algorithms for efficient angular search, and low level optimization of the algorithms. After initial development, the algorithms will be modified to allow for frequency-specific optimization, making use of the modern mmWave spectrum standard and developing statistical spatial channel model.

The faculty advisors of the project are Dennis Shasha, Sundeep Rangan, and Ted Rappaport. George Wong will be working on the project. George is Dennis Shasha’s undergraduate advise. He is completing his third year as an undergraduate. He has a strong foundation in software and wireless physics. He has worked on the collection of the data and on the database system itself and has several papers with Ted on wireless.

George will work directly with the faculty and with the various graduate students at NYU School of Engineering who are developing the 28 and 73 GHz Statistical Spatial Channel Models.