**What's the goal of project?**

**Understanding the mathematics of Highly-Constrained Backprojection (HYPER) is part of the work of graduate students in the Applied Mathematics Project from GE Health care Technologies.**

**We are in a search to optimize performance of medical MRI imaging system through applied mathematics, by analyzing the original HYPER algorithm and related HYPER algorithms(Wright HYPER,1 HYPER), also we study the Expectation-Maximization (EM) algorithm which is an important tool for maximum likelihood (ML) estimation and theoretical formulation for estimating statistical properties of medical image reconstructed . Since the noise and its potential adverse effects on medical image quality, it requires a detail understanding of the statistical properties of the image. We use MATLAB program to run simulations of a simple circular dynamic models such as a disk with radius r that moves in different configurations with respect to time.**

**We form a projection of a disk which is represented by a two dimensional functions f(x,y) by combining a set of line integrals that's parameterized by ($\theta$,p) and satisfy the equation, x cos($\theta$)+y sin($\theta$)=p. The line integral g(t,$\theta$,p) which is known as the Radon transform of the function f(x,y) can be written as**

**g(t,θ,p)=$\iint f(x,y)($(x cos(θ)+y sin(θ)-p)dx dy, Where time (t) is fixed.**

**Next, in order to reconstruct the image f(x,y) we use Filtered Backprojection and The Central-Slice Theorem.**

**Thank you for your time**