A large number of both extrinsic and intrinsic parameters affect contrast and contrast-to-noise ratio in MRI. Extrinsic parameters include magnetic field strength, the particular pulse sequence, the acquisition parameters (echo time, repetition time, flip angles, *etc.*), and exogenous contrast agents. Intrinsic parameters include proton density, T_1 , T_2 , T_2^* , velocity, chemical environment, temperature, perfusion, diffusion, and magnetization transfer.

Educational Objectives:

The clinical medical physicist will understand how a wide variety of intrinsic and extrinsic parameters impact contrast and contrast-to-noise ratio in MRI.

Upon completion of this course, participants will be prepared to:

- 1. Describe how the choice of pulse sequence and the associated image acquisition parameters affect image contrast.
- 2. Describe how the magnetic field strength affects contrast.
- 3. Describe how common MRI contrast agents influence image contrast.
- 4. Describe how fundamental intrinsic parameters such as proton density, T₁, T₂, and T₂* affect image contrast.
- 5. Explain the basis of image contrast in perfusion, diffusion, magnetization transfer, MR angiography, and fluid attenuated inversion recovery (FLAIR) imaging.