M219: Introduction to Magnetic Resonance Imaging (MRI)

Winter 2025
Lectures: Mon/Wed 2pm – 3:50pm
BH-173, CHS, Bauer Auditorium

Instructors:
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Learning Objectives:

To introduce the students to the fundamental principles of magnetic resonance imaging.
To demonstrate basic applications of MRI.

Grading Structure:

There will be three homework assignments and a final exam.

- Homework: 60%
- Class Participation: 10%
- Final Exam: 30%

Course Schedule:

Lecture	Date	Topic
#1	Jan 6, 2025	Introduction
#2	Jan 8, 2025	MRI Systems I: B0 and Bulk Magnetization
#3	Jan 13, 2025	MRI Systems II: Nuclear Precession and B1
	Homework #1 out	
#4	Jan 15, 2025	Bloch Equations and Relaxation I
#5	Jan 20, 2025	MLK Holiday
#6	Jan 22, 2025	Bloch Equations and Relaxation II
#7	Jan 27, 2025	MRI Systems III: Gradients
#8	Jan 29, 2025	Imaging Principles
	Homework #1 due, Homework #2 out	
#9	Feb 3, 2025	Spatial Localization I
#10	Feb 5, 2025	Spatial Localization II
#11	Feb 10, 2025	MRI Signal Equation and Basic Image Reconstruction (by Dr. Wu)
#12	Feb 12, 2025	Fast Imaging and Advanced Image Reconstruction (by Dr. Wu)
	Homework #2 due, Homework #3 out	
#13	Feb 17, 2025	Presidents' Day Holiday
#14	Feb 19, 2025	Imaging Sequences I
#15	Feb 24, 2025	Imaging Sequences II
#16	Feb 26, 2025	Imaging Sequences III
#17	Mar 3, 2025	Volumetric Imaging (by Dr. Zhong)
#18	Mar 5, 2025	Fast Imaging (by Dr. Christodoulou)
	Homework #3 due	
#19	Mar 10, 2025	Basics of MR Spectroscopy (by Dr. Thomas)
#20	Mar 12, 2025	Fast MR Spectroscopic Imaging (by Dr. Thomas)
	Mar 17-21	**Final Exam**