

# M219: Introduction to Magnetic Resonance Imaging (MRI)

Winter 2023

Lectures: Mon/Wed 2pm – 3:50pm

BH-173, CHS, Bauer Auditorium

## Instructors:

Kyung Sung: 310-267-6842, [ksung@mednet.ucla.edu](mailto:ksung@mednet.ucla.edu)

Holden Wu (Guest Lecturer)

Albert Thomas (Guest Lecturer)

## 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 3 homework assignments and a final exam.

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

## Course Schedule:

Lecture	Date	Topic
#1	Jan 9, 2023	Introduction
#2	Jan 11, 2023	MRI Systems I: B0
#3	Jan 16, 2023	MLK Holiday
<b>Homework #1 out</b>		
#4	Jan 18, 2023	Bulk Magnetization and Nuclear Precession
#5	Jan 23, 2023	MRI Systems II: B1
#6	Jan 25, 2023	Bloch Equations and Relaxation / MRI Signal Detection
#7	Jan 30, 2023	MRI Systems III: Gradients
Homework #1 due, Homework #2 out		
#8	Feb 1, 2023	Fundamental Math of MRI
#9	Feb 6, 2023	Spatial Localization I
#10	Feb 8, 2023	Spatial Localization II
#11	Feb 13, 2023	MRI Signal Equation and Basic Image Reconstruction (by <b>Holden Wu</b> )
#12	Feb 15, 2023	Fast Imaging and Advanced Image Reconstruction (by <b>Holden Wu</b> )
<b>Homework #2 due, Homework #3 out</b>		
#13	Feb 20, 2023	Presidents' Day Holiday
#14	Feb 22, 2023	Basic Pulse Sequences I: Saturation Recovery and Inversion Recovery
#15	Feb 27, 2023	Basic Pulse Sequences II: Gradient Echoes
#16	Mar 1, 2023	Basic Pulse Sequences III: Spin Echoes
#17	Mar 6, 2023	Basics of MR Spectroscopy (by <b>Dr. Albert Thomas</b> )
#18	Mar 8, 2023	Fast MR Spectroscopic Imaging (by <b>Dr. Albert Thomas</b> )
<b>Homework #3 due</b>		
#19	Mar 13, 2023	TBD
#20	Mar 15, 2023	Vascular MRI (by <b>Dr. Zhaoyang Fan</b> from USC)
<b>Mar 20-24</b>		<b>Final Exam</b>