

**26. Introduction to Magnetic Resonance Imaging I and II**  
**2 units, Ross Boltyanskiy, November 3 and 4, 2025**

November 3, 2025

**I. MRI**

- a. Fundamental of NMR: magnetic moments, polarization, RF, precession, detection
- b. Relaxation: T1, T2, T2\*
- c. MRI hardware: bias magnet, gradient coils, RF coils
- d. Contrast mechanisms: relaxation, proton density, diffusion
- e. Basic sequences: Inversion recovery, spin echo, gradient echo
- f. Magnetic resonance spectroscopy
- g. MR focused on cancer: contrast through material properties and biological function.

November 4, 2025 – with Roberta Pigliapochi

**II. Hands-on session with table top MRI**

- a. Tuning, matching, shimming
- b. Acquiring T1, T2 images
- c. Reconstructing T1, T2 maps