A **quick** **introduction** to working with medical images in Python

A presention in two parts

Peter Goodin

Medical images?

- Umbrella term for methods that visualise the human body for medical examinations and intervention

- Medical images can be aquired using:
  - Electromagnetic radiaton (M & EEG, NIRS, ECG, MRI)
  - Sound (Ultrasound, echocardiogram)
  - Ionising radiation (PET, X-ray / CT)

  This presentation will focus on MRI.

Wait. Who are you again?

- Dr. Peter Goodin (B.Sc*, Ph.D - Psychoneuroimmunology)
- Currently - Senior Data Scientist at HitIQ
- Previously -
  - Fifteen years working with electromagnetic imaging methods (M/EEG, MRI)
  - Two years working with CT @ RMH
  - Neuroimaging correlates of condom sensation

Magnetic Resonance Imaging (MRI)

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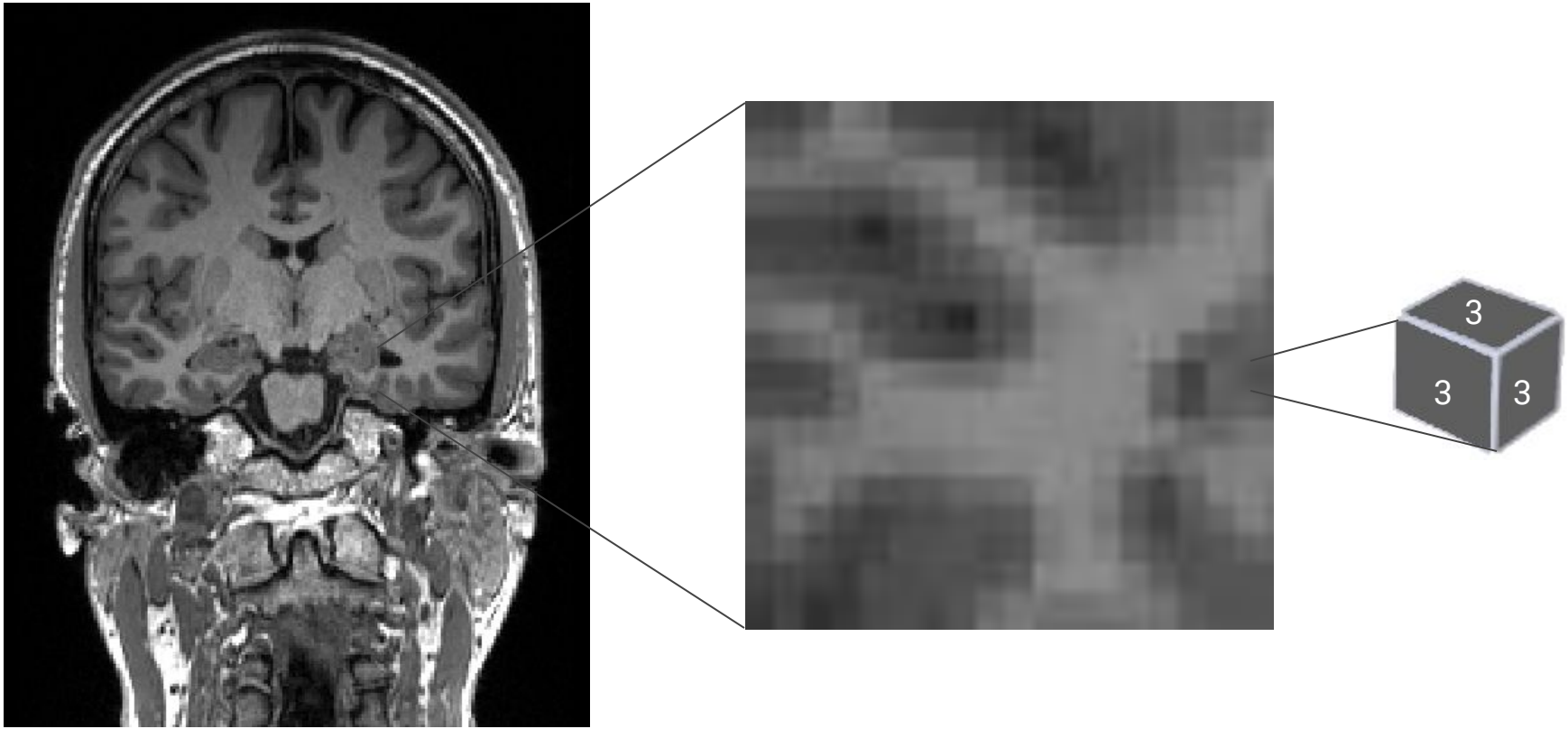
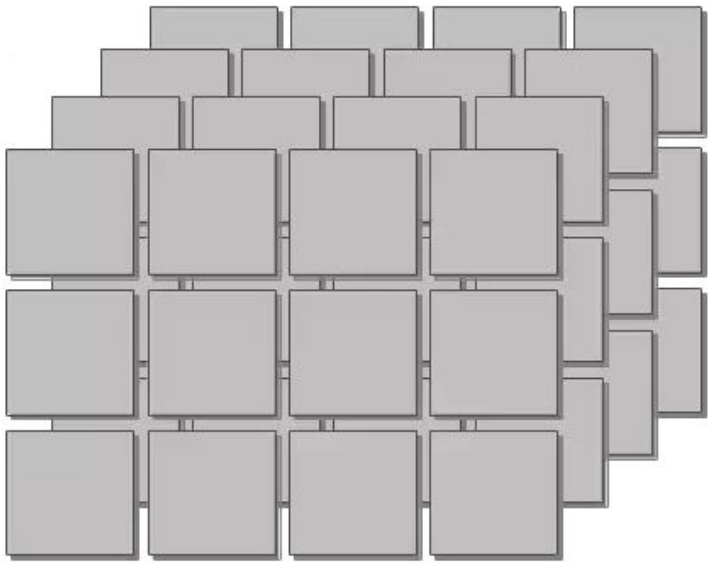
Magnetic Resonance Image





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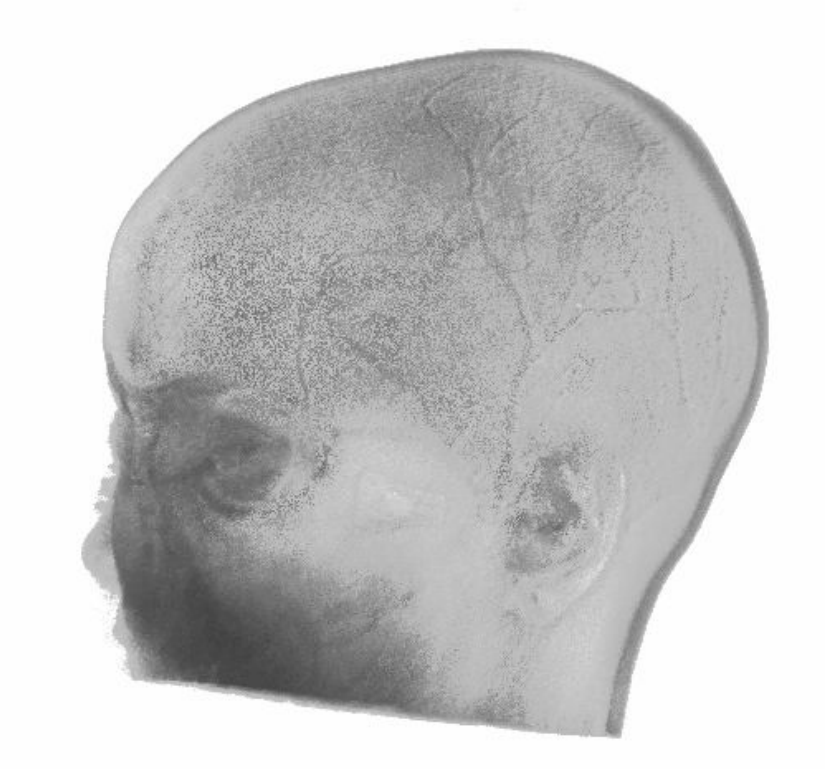
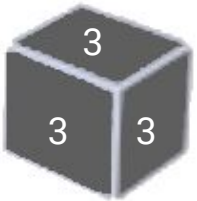
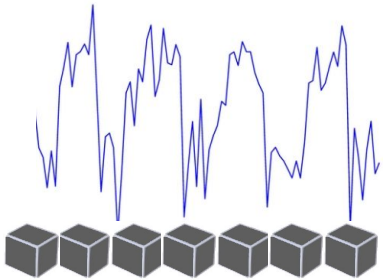


Magnetic Resonance Image types

Structural (eg T1, T2)



Functional (eg fMRI)



Diffusion (eg DTI / FBA

Uh huh. Yep. But what are you going to show us?

- Reading nii data (nibabel)
- Numerical manipulation (numpy)
- Plotting 1d (Matplotlib / Seaborn)
- Plotting 2d (Matplotlib, Napari)
- Plotting 3d (Napari)
- Bias correction (ANTs)
- Brain extraction (ANTsPyNet)
- Basic segmentation of tissue types (sklearn)
- Template space transform (ANTs)

TO THE CODE! :D

(note: tested using Miniconda + Ubuntu 20.04)