

# Audio recording

# Learning objectives

1. Understand principles of sound
2. Understand conventions of recording tools
3. Understand best practices ('what')  
and underlying rationale ('why') for recording sound

# Science of sound

- Sound waves lose energy over time/space
- Sound waves reflect off objects
  - Most reflective: Hard, flat surfaces
  - **Echo vs Reverb:** Difference is time/space

# Recording tools & volume

- Volume meters/levels in decibels (dB)
  - Relative measurement; max is usually 0 dB
  - **Clipping** (distortion): At/near max value
  - Ideal peak for voice: **-12 dB** (+/-6 dB)
- **Gain**: Change (dB) to volume
- Recording (input) vs playback (output) volume/gain
  - Increased input-gain = increased mic-sensitivity

# Channels

- **Channel:** Digital pathway for sound signals
  - Input device / output side
  - **Mono:** One unique audio track
  - **Stereo:** Up to two unique audio tracks
  - Recordings of 3+ channels possible

# Microphone types

- Wearable: Transmitter/**lavalier/lapel** near collarbone
  - One person
- Mounted: Within one hand-length or two fist-lengths
  - One person or group within arm-length
- **Shotgun/boom**: Necessitated distance
  - Multiple sources

# Pickup patterns

- Different-shaped areas/ranges for sound pickup
  - **Cardioid:** Heart shape
  - **Omni-directional:** 360-degree shape
  - **Bi-directional:** Tandem circle shapes
  - Other shapes (variations)
- Some mics have changeable shapes
- Shape of mic and/or position of grills

# Cables & adapters

- USB (USB-A, USB-C)
- 3.5 mm (TRS = one **R**ing, TRRS = two **R**ings)
  - TRS: One-way path; use for following usual flow
  - TRRS: Two-way path; use for opposing usual flow
- 1/4 in, XLR
- Adapters for mentioned cables



# Filetypes

- **Lossy** formats: Smaller files-sizes
  - MP3, AAC, others
- **Uncompressed** format: Higher quality
  - WAV, AIF, others
- Lossy formats have irreversible data-loss

# Checklist for voice recording

1. Avoid hard, flat surfaces
  - Use acoustic foam or household blanket
2. Put mic (and person) in comfortable position
  - Be within one hand-length or two fist-lengths
3. Set input volume/gain for -12 dB peaks
  - Recite alphabet in usual voice
4. Use accessories if needed (**windshield, pop filter**)