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February 26, 2016
Agenda

1. Basics of Sound Recording
2. Planning a Recording Session
3. Demonstration of Recording Process (Laptop & TASCAM)
4. Audio Transfers (Digitization)
5. Recording on Mobile Devices
   a. Android App
   b. iOS App
6. Editing Audio Recordings
7. Storage Considerations
8. Hands-on Experience
What is Sound?

Audible mechanical wave of pressure and displacement
(source: Wikipedia)

Sound Waves

- Frequency (pitch) - Hz
- Amplitude (loudness) - dB
Basics of Sound Recording

Audio Signal Path

Input (Microphone or Audio Source) → Mixer (Analog to Digital Converter) → Storage (Laptop)

Watch out for:
“Critical Air Gap”
Basics of Sound Recording

Using a Microphone

Watch out for:
Proximity Effect

Ideal Distance
3-5 Inches

dB
2 inches
2 Feet

Bass  Mid-Range  Treble

Images:
www.iconfinder.com
www.americanmusical.com
www.prosoundweb.com
shure.co.uk
Basics of Sound Recording

Analog to Digital Conversion

Watch out for: Aliasing
(AKA Distortion or Artifacts)

Images: www.centerpointaudio.com
www.hifivision.com
Basics of Sound Recording  

Setting Volume Levels  

Watch out for:  
Signal to Noise Ratio  

Signal to Noise Ratio (SNR) is a measure of the quality of a signal. It is defined as the ratio of the signal power to the noise power. A high SNR indicates a high-quality signal with little noise, while a low SNR indicates a low-quality signal with a lot of noise.

Low Volume  
Ideal Volume  
Too Loud!  

Low SNR  
Ideal SNR  
CLIPPING!
Planning an Audio Recording Session

**PERSONNEL:** What skillset is necessary to perform the recording sessions?

**LOCATION:** Where will you be recording?

**STORAGE:** Where will the recordings be stored?

**USAGE:** How will the recordings be used?

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**Hardware**

- **Higher quality**
- **More difficult to set up**

- **Easier to use**
- **Lower quality**

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Images:
- www.americanmusical.com
- www.amazon.com
- www.freestockphotos.biz
- www.megaicons.net
- www.imeimage.com
Planning an Audio Recording Session

Software

Images:
mewshop.com
transom.org
audacityteam.org
itunes.apple.com
Recording on a Laptop

Image Path
- [en.wikipedia.org](https://en.wikipedia.org)
- [www.americanmusical.com](http://www.americanmusical.com)
- [www.amazon.com](http://www.amazon.com)
- [www.freestockphotos.biz](http://www.freestockphotos.biz)
- [www.iconfinder.com](http://www.iconfinder.com)

**Narrator (MIC L)**

**Interviewer (MIC R)**

**Mixer**

**XLR Cable**

**USB**

**Storage**
Recording on a Laptop

TASCAM Settings

**INPUT L & R:** Most of the way to the right

**PHANTOM:** OFF

**MIC/LINE - GUITAR switch:** set to MIC/LINE

**MONO:** OFF

**PHONES/LINE OUT:** Most of the way to the right
Recording on a Laptop

Audacity Settings

Set Microphone Input

Set Recording Quality

(Edit > Preferences > Quality or CTRL+P)

- Default Sample Rate: 44100 Hz
- Default Sample Format: 24-bit
- Sample Rate Converter: High-Quality
- Dither: Shaped
- Sample Rate Converter: Best Quality (Slowest)
- Dither: Shaped
Recording on a Laptop

Testing Levels

Begin Test Recording
(Shift+R)

3-5 Inches

Levels should be in this zone

End Recording
(Spacebar)

Adjust Volume Levels
Recording on a Laptop

Preparing to Record

1. Record in a space with minimal ambient noise or distractions
2. Place one microphone facing each person who will be talking.
3. Give a lesson in how to use the microphone
   (Speak loudly, position the microphone 3-5 inches from mouth)
4. Test the microphones levels before starting
Recording on a Laptop

Conducting the Recording

- **Begin Recording**: (Shift+R)
  - Pausing or stopping the recording midway is not recommended

- **End Recording**: (Spacebar)

- **Replay Recording**: (Spacebar)
  - Replaying a portion of the recording will verify that the sound quality is adequate

- **Save Recording**: (CTRL+S)
  - Save each interview as an individual Audacity project
Audio Transfers

Digitizing Analog Media
Audio Transfers

Input (Audio Source) → Mixer (Analog to Digital Converter) → Storage (Laptop)

Images:
- www.clker.com
- www.freepik.com
- www.howtogeek.com
Audio Transfers

Connecting to TASCAM

RCA → ¼ inch
Red=Right
Black=Left

Plug RCA into Line Out

Plug ¼ inch into Line In

Input L & R should be most of the way to the left

RCA Female to Female Couplers

Plug ¼ inch into Line In

Images:
- pixabay.com
- openclipart.org
- amazon.com
Audio Transfers

Connecting Directly to Laptop

RCA → ⅛ inch
Orange=Right
Grey=Left

Plug RCA into Line Out

RCA Female to Female Couplers

Plug ⅛ inch into headphone jack

Images:
- pixabay.com
- openclipart.org
- amazon.com
Audio Transfers

Audacity Settings

Set Microphone Input

Set Recording Quality
(Edit > Preferences > Quality or CTRL+P)

- **Default Sample Rate:** 44000 Hz
- **Default Sample Format:** 24-bit
- **Sample Rate Converter:** High-Quality
- **Dither:** Shaped
- **Sample Rate Converter:** Best Quality (Slowest)
- **Dither:** Shaped
Audio Transfers

Care, Handling, and Storage of Audio Visual Materials

http://www.loc.gov/preservation/care/record.html

Clean Media
(and ensure proper storage)

Compressed air

Discwasher

Images: www.loc.gov
amazon.com
Audio Transfers

Test Playback

Connect source

Begin Playing Source Media

Plug in headphones to monitor playback

May need to change Source or Output

Levels should be in this zone
Audio Transfers

Recording in Audacity

- **Begin Recording**
  - (Shift+R)
- **Begin Playing Source Media**
- **End Recording**
  - (Spacebar)
- **Replay Recording**
  - (Spacebar)

Replaying a portion of the recording will verify that the sound quality is adequate.

- **Save Recording**
  - (CTRL+S)

Save each interview as an individual Audacity project.
Recording on Android

Easy Voice Recorder

Free App
Includes most necessary features

Paid App - $3.99
Ad-free
Allows for the boosting of recording volume
Recording on Android

Main Settings

Main Use: Meetings and lectures
Sound Quality: High (larger files)

Tuning Settings

Microphone: Main
Encoding: .wav (PCM, 5 MB/minute)
Sample rate: 44kHz (CD)
Recording on Android

Testing Levels

Begin Recording

Levels should be in this zone

End Recording

Check Recording

Easy Voice Recorder

<table>
<thead>
<tr>
<th>Recording</th>
<th>Duration</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>My recording #6.wav</td>
<td>00:01</td>
<td>0.2 MB</td>
</tr>
<tr>
<td>My recording #5.wav</td>
<td>00:08</td>
<td>0.7 MB</td>
</tr>
<tr>
<td>My recording #4.wav</td>
<td>00:10</td>
<td>0.9 MB</td>
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<tr>
<td>My recording #3.wav</td>
<td>00:22</td>
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</tr>
<tr>
<td>My recording #2.wav</td>
<td>02:09</td>
<td>10.9 MB</td>
</tr>
</tbody>
</table>
**Recording on Android**

**Begin Recording**
Try not to touch the Android device while recording

**End Recording**

**Replay Recording**
Check for recording quality

**Transfer File**
To preferred cloud storage (e.g. Google Drive)

**Recording the Interview**
Recording on iOS

Voice Record Pro

Free App

Images:
www.apppicker.com
Recording on iOS

Settings

Recording Settings

Minimum Space: 500 MB (or more)

Advanced Recording Options

Record Format: WAV (PCM)
Sample Rate: 44,100
Bit Depth: 16 Bits
Channels: Mono
Silence Detection: No
Record Engine: Advanced
Recording on iOS

1. RECORD
2. Level Check
3. DONE

Adjust Input Gain (volume) to fix levels

Should be in this range

Testing Levels
Recording on iOS

Recording the Interview

Try not to touch the iOS device while recording

Check for recording quality
Recording on iOS

Transferring Files

Select recording

Save to preferred cloud storage (e.g. Google Drive)
Editing Audio

1. Open Audacity project file
2. Audio Track dropdown > “Split Stereo to Mono”

Removes panning and allows for adjustment of individual microphones

Not necessary for digital transfers
1. Open Audacity

2. Locate and open recording file
   (download from cloud storage if necessary)

3. Choose the following options:

   - Make a copy of the files before editing (safer)
   - Read the files directly from the original (faster)
   - Don’t warn again and always use my choice above

Maintains the integrity of the original file in case of an error
Editing Audio

Disclaimer

*Editing should be performed only if necessary and only to improve clarity.*

*Editing of the recording should be kept to a minimum to preserve the integrity of the original recording.*

*Always keep an unedited master copy for archival purposes.*
**Editing Audio**

1. Select cursor tool
2. Drag across unwanted section in both tracks
3. Press delete key

*Remove Long Silences*
Editing Audio

Remove Unwanted Noise

1. Select cursor tool
2. Drag across unwanted section of single track
3. Click Silence Audio Tool
Adjust volume of individual microphones using that track’s volume slider.
Editing Audio

1. Select cursor tool
2. Drag across section to be amplified
3. Select “Amplify” from the Effect menu
4. Drag the amplification to desired level (New Peak Amplitude should never exceed 0.0)
Storage Considerations

**Master & Access Copies**

**Master**
- Create 3 copies of your data (1 primary copy and 2 backups)
- Store your copies in at least 2 types of storage media (local drive, network share/NAS, tape drive, etc.)
- Store 1 of these copies offsite

**Access**
- Internet Archive
- New York Heritage Digital Collections
- StoryCorps

Images:
- www.acronis.com
- archive.org
- nyheritage.org
- logos.wikia.com
Storage Considerations

Creating Master Copies

File > Export Audio
(Ctrl + Shift + E)

Save as type
Other uncompressed files

Options
Header: WAV (Microsoft)
Encoding: Signed 24-bit PCM

File size
approximately 8.64 MB per minute
Creating Access Copies

Storage Considerations

File > Export Audio
(Ctrl + Shift + E)
Save as type MP3 Files

Options
Bit Rate Mode: Variable
Quality: 0, 220-260 kbps
Variable Speed: Fast
Channel Mode: Joint Stereo

You will need the LAME MP3 Encoder for this step. Installation Instructions can be found here: http://bit.ly/1IeNYZh

File size approximately 1.92 MB per minute
Hands-On Experience

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