

**Making it Less Scary: Performing Electroacoustic Works with Your Ensemble**  
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**I. Introduction**

- a. *Why are these works important, why should we bother understanding them let alone programming them?*
  - i. Appeals to students' increasing interest in music technology
  - ii. Encourages active listening in a different acoustic environment
  - iii. Increases diversity of programming, programming living composers
  - iv. Small groups benefit from the electronic reinforcement, confidence
  - v. Appeals to students' desire to perform "pop" music without programming novelty pieces
  - vi. They're fun!
- b. *What do we mean by electroacoustic?*
  - i. Using electronic components (live and/or fixed) to extend the timbral and artistic abilities of the ensemble; a critical aesthetic component
  - ii. These are artistic endeavors of their own merit, not just novelty pieces
  - iii. NOT: simple sound effects, just using a mic to amplify, or video alone

**II. General Rehearsal Tips Regardless of Technology:**

- a. For Rehearsals:
  - i. MUST rehearse music first *without* electronics
    - 1. Why? It's easy for musical issues to be covered up by electronics (a benefit in performance, a negative in rehearsal)
  - ii. Electronics player: practice things going wrong & troubleshooting
  - iii. Setup time issues:
    - 1. If possible, leave what gear you can setup to help save time.
    - 2. Use gear installed in the room for rehearsal
    - 3. Start to rehearse simpler (one speaker?) and scale up
    - 4. Teach musicians to do it all! Assign different components to ensemble members with simpler instrument assembly
- b. For Performance:
  - i. Electronics performer should be clearly visible, seen as part of group
  - ii. Where to put the speakers?
    - 1. Electronics are part of the ensemble, so speakers should be behind/within the group
    - 2. Two speakers for stereo, wide enough apart to get the effect
  - iii. Important factors to think through:
    - 1. Audio OFF when not using, mute system sounds, "do not disturb"
    - 2. Screen locks/password requirements?
    - 3. Power Needs?
  - iv. Balance considerations: an audience will dampen electronics; know what "balanced" in the audience sounds like on stage (it's different!)
- c. Broad Concepts:
  - i. Electronics are an instrument: conductor must know the electronic part and how it integrates just like any other instrument in the score
  - ii. Musicians need access to the electronics to practice with/listen

- iii. Adhere to speaker setup considerations:
  - 1. Avoid house sound, especially when installed far above/away from ensemble
  - 2. Setup speakers and subwoofer behind/withing the group
  - 3. Stereo vs. mono matters! If stereo sound, must run separate line to left/right speakers!
  - 4. Is a subwoofer necessary?
    - a. Sometimes optional. If not optional, there's a reason!
  - 5. Standard speakers only reproduce certain frequency ranges well, can't go as low as a sub. If electronics have frequencies outside your equipment's range, they'll be missing
  - 6. Sound fidelity is generally better when you use a subwoofer
- iv. Can the ensemble hear without being harmed?
  - 1. Even if not required, monitors are almost always a good idea
  - 2. Earplugs!
  - 3. More speakers = less direct volume from any single source
    - a. Less likely to harm those nearest the speakers

### **III. Grading Electronics**

- a. Imagine a grading system along the lines of musical difficulty (1–5, 6+, etc.)
  - i. All grades are additive:
    - 1. Grade 1 – Audio player only (no click track needed)
    - 2. Grade 2 – Computer required, QWERTY keyboard cues
    - 3. Grade 3 – Audio interface required, click track
    - 4. Grade 4 – Requires a controller (MIDI keyboard, drum pad, etc.)
    - 5. Grade 5 – Requires microphones or other special gear
    - 6. Grade 6 – Multiple synchronized components. Everything but the kitchen sink... actually, grab the kitchen sink
  - b. All categories are based on composer's instructions for performance. There are always options to flex up/down in difficulty of technology

### **IV. What does each level look like?**

- a. Grade 1 – Audio Player only
  - i. Easiest, entry level, super low stress
  - ii. No click, tempo changes if any are either easy to navigate by listening
  - iii. Examples
    - 1. Benjamin Dean Taylor – *Electric Breakdance* (music grade 1.5)
    - 2. Alex Tedrwo – *hitchBOT* (grade 2)
    - 3. Jennifer Rose – *Bitscapes* (music grade 4)
    - 4. José Alberto Pina – *The Ghost Ship* (music grade 5)
    - 5. Donald Erb's – *Stargazing* (music grade 3.5); *Purple Roofed Ethical Suicide Parlor* (music grade 5)
  - iv. Special Rehearsal considerations:
    - 1. If no timestamps/rehearsal tracks, might have to make them:
      - a. Write in time stamps or use platforms to create your own starting points (stream decks, drum pads)

- b. Check out Qlab!
- b. Grade 2 – Computer Required, Keyboard cues
  - i. Slight step up, still doesn't necessarily *require* an audio interface
  - ii. Examples without audio interface:
    - 1. Steven Bryant – *Synthetic Sunlight* (musical grade 3)
  - iii. Rehearsal considerations:
    - 1. Less to manage because the cues are already setup and can be started/stopped as needed
    - 2. Still might need extra effort to get more granular in rehearsal
- c. Grade 3 – Audio Interface Required, possibly click track, subwoofer ideal
  - i. Quick Aside:
    - 1. Though the previous categories don't *require* an audio interface, they can benefit from it
  - ii. Examples:
    - 1. Alex Shapiro – *Paper Cut* (musical grade 3)
    - 2. Erica Svanoë – *Haunted Carousel* (musical grade 3)
- d. Grade 4 – Controller required:
  - i. Most interactive, from here it's just adding more moving parts
  - ii. Examples:
    - 1. Daniel Montoya Jr. – *Axe to Grind* (musical grade 2.5)
    - 2. JoAnne Harris – *Voices of the Inside Passage* (mus. grade 3.5)
    - 3. Mason Bates – *Mothership* (musical grade 4)
- e. Grade 5 – Multiple pieces of tech, microphones, and more
  - i. If you're at this stage, you likely have experience with these works
  - ii. Most well known-example:
    - 1. Steven Bryant's *Ecstatic Waters* (musical grade 5)
- f. Grade 6 – Everything but the kitchen sink... Actually, you know what, bring the sink...
  - i. At this stage you really need a specialist to execute these works
  - ii. Examples:
    - 1. Christopher Stark – *Velocity Meadows*

## V. Resources for Programming

- a. Justin Hubbard's annotated list
  - i. Contact me for details, happy to help anyone with these works!
  - ii. Detailed, but not as comprehensive yet
  - iii. [www.justinhubbard.com/eaworks](http://www.justinhubbard.com/eaworks)
- b. Emily Warren's list
  - i. Linked via my website, listed above (not current, copy from 2/2024)
  - ii. Larger list, but not as detailed in what the electronics are
- c. Composers themselves
- d. [www.windrep.org](http://www.windrep.org)
  - i. Detailed on the music, not on the electronics components
- e. [www.andwewereheard.com](http://www.andwewereheard.com)
  - i. Focus on diversity, not as detailed on the electronics components

## Terms and Jargon (Alpha Order)

Term	Definition
Audio Interface	An external sound card or mixer that connects to a computer, tablet, or other device. It serves as a bridge between the connected device and the external audio environment/equipment. It converts digital audio signals to analog audio signals that speakers and amps can use.
Balanced Cable	A cable and signal designed to be resistant to interference. They typically have at least three wires inside and three visible contact points on the external connector (e.g. XLR and TRS connectors)
Channel	<p>The definition depends on the context:</p> <ul style="list-style-type: none"> <li>• Generally, a single path for carrying audio or data</li> <li>• On a mixer or interface, a set of controls for a single input (e.g., Input 1 corresponds to Channel 1)</li> </ul>
Controller	A device that sends trigger signals to a sound generating device/program. Controllers do not create sounds on their own (though some are multipurpose and can do both).
Daisy Chain	Connecting devices or speakers together in a chain so the signal passes from one to the other. Think of it as a string of lights: electricity passes into and illuminates one light, then out to the next, and so on.
MIDI Keyboard	An electronic piano-style keyboard capable of controlling an external processor. It can vary in the number of octaves or keys, up to a full 88-key piano-style keyboard.
Input	The connector or device that accepts or receives a signal, such as the 1/4" inputs on an audio mixer or interface. It is usually labeled on devices as "input" or "in" with a corresponding number.
MIDI	Abbreviation for Music Instrument Digital Interface, a type of connection used to connect digital musical instruments to their sound generating component. Note: MIDI is only data that tells a device what/how/when to sound, it carries no audio signal itself
Mono	A single channel signal, designed to be perceived as coming from a single position.
Output	The connector or device that sends a signal, such as the 1/4" outputs on an audio mixer or interface. Usually labeled as "output" or "out," paired with an identifying number or "L" for Left or "R" for Right.
Signal	An electrical translation of an audio event. They can be sent analog (e.g., any connection using a 1/4" or XLR connection is analog) or digitally via data packets (e.g., USB connections to an audio interface or MIDI connections).
Stereo	A two-channel signal, usually one left and one right, designed to spatialize sound. Each signal is sent to a speaker, one placed to the left and one to the right of the listener. A stereo signal is fundamentally two separate mono signals working together to create a stereo sound field.
Subwoofer	Speaker for reproducing low frequencies, typically 20–160 Hz (~E0–E3)
Trigger	An electric signal that initiates an action, either within a computer program or other electric processor. The action can involve generating a sound, a series of sounds, changing settings, or other forms of automation.