

**Client/Company/Organization:** \_\_\_\_\_

**Submitter Name:** Randall Geiger and Degang  
Chen **Email:** rlgeiger@iastate.edu

**Project Contact:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Project Title:**  
Sound Effect Devices for Musicians

**Project Abstract:**

This project will involve the design and testing of a universal sound effects device targeting use by live entertainment musicians. There are numerous sound-effects devices available that provide interesting and creative effects. These include wah-wah, fuzz, overdrive, phasing, flanging, chorus, vibrato, tremolo, rotary speaker, octave dividers, and a host of others. These devices usually have an input coming from a guitar or some other musical instruments. A large number of these devices have emerged over the years but the demand exists for other devices that produce effects that are more interesting or novel than what is available or are easier to use and integrate. The Guitarworld magazine (Nov 30, 2015) recently reviewed 50 such devices that have been used over the years. Other sound effects devices are used to create unique sounds and these might include synthesizers based upon a keyboard entry or theremin-type device. The latter are actually musical instruments themselves but the sounds they are capable of producing are completely different from that attainable by any physical musical instruments.

**Expected Deliverables:**

Based upon student interests, this project could take on one of three different approaches. One could be the development of another type of sound-effect device. A second could be the development of a system that interfaces several existing devices with a suitable mixing strategy so that musicians can control the mix real-time possibly by hand, head, or foot movements in a way that offers improvements over existing interface methods. A third could be the development of a sound generation device such as a theremin with an optical interface that will produce interesting sounds different from what is currently available. Depending upon the focus, the deliverables would include the development of a prototype device and an assessment of the benefits and limitations of the prototype by a small group of individuals that are not a part of the design team.

**Specialized Resources Provided by Client:**

As described in this project description, the flexibility is intentionally broad to allow individual creativity and interests to dictate the direction of the project. Only students that are interested in exploring their creativity or that have ideas that they would like to bring to the prototype level should consider this project. Experience as a performer or performing tasks associated with those of an audio engineer would be most useful but are not required.

**Anticipated Cost:** \_\_\_\_\_ **Financial Resources Provided by Client:** \_\_\_\_\_

**Preferred Students for the Project:**

- Electrical Engineering
- Computer Engineering
- Software Engineering

**Other Special Skills:**

Other:

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**Anticipated Client Interaction (estimate):**

- 1 meeting per week
    - In person,  Over the phone,  Web / video conferencing
  - 1 meeting per month
    - In person,  Over the phone,  Web / video conferencing
  - 2 or more meetings per month
    - In person,  Over the phone,  Web / video conferencing
  - 1 meeting per semester
    - In person,  Over the phone,  Web / video conferencing
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**Meeting ABET Criteria**

Please rate the following statements as they relate to your proposed project:

0 – Not at all                      1 – A Little                      2 – Somewhat                      3 – A Lot                      4 – Completely

On this project, students will need to apply knowledge of mathematics, science, and engineering  0     1     2     3     4

This project gives students an opportunity to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability  0     1     2     3     4

This project involves students from a variety of programs, i.e., CprE, EE, and SE  0     1     2     3     4

This project requires students to identify, formulate, and solve engineering problems  0     1     2     3     4

This project gives students an opportunity to use the techniques, skills, and modern engineering tools necessary for engineering practice  0     1     2     3     4

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**Project Approval – for use by ECpE Senior Design Committee**

- Approved: \_\_\_\_\_
- Project Assigned: sdmay18-39
- Advisor(s) Assigned: Randall L. Geiger (rlgeiger@iastate.edu)  
Degang Chen (djchen@iastate.edu)