ECE 4871 -- Form for Proposing Student Projects

ECE 4871 students may propose their own projects for consideration by filling out the form below and submitting it via Canvas and email to Bruno.Frazier@ece.gatech.edu .

Please follow the instructions contained in the form below and properly name your file prior to submission.

Basic Information

Student Name: Elizabeth Herrejon **Major:** EE **GTID Number:** 903284817

Email address: eherrejon3@gatech.edu

ECE 4871 Term: Fall 2021 **ECE 4872 or ECE 4873 Term:** Spring 2022

Note: ECE4872 and ECE4873 are taught only in Spring and Fall terms.

☐ Check if this project is proposed for ECE 4873 (multidisciplinary design teams only) instead of ECE 4872.

Project Title and Team Name

Team Name:

Project Title: Self Defense Weapons

Proposed Advisor

If a faculty member has already agreed to supervise proposed project, list his/her name below. If not, list the ECE project advisor you believe is most appropriate for the proposed topic.

Project Advisor:

☐ Check if the advisor has already agreed to supervise this project

Team Information

Please list the proposed size of your team, the composition of the team members, and other students in ECE4871 that have expressed interest in this project.

Number of EE members: 4 **Number of CmpE members:**

Other ECE4871 students interested in this project:

2

If it is anticipated that this project will be multidisciplinary, then please list other schools within the College of Engineering at Georgia Tech from which students might be drawn. Note that multidisciplinary teams from ECE will be expected to take ECE4873 for their 2nd semester instead of ECE4872.

Other disciplines anticipated from GT-COE:

Number of non-ECE team members:

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Explain how the proposed project relates to your major(s) and background

The overall project topic must constitute a significant culminating design experience appropriate to the major(s), experience, background, and advanced courses (e.g., electives) of the participating students.

This project will relate to our major(s) and background as some teammates will be taking IC Fabrication and others are taking robotics classes. So far, all of the teammates are electrical engineering but with all different focuses. This relates to the teammates major as we are mostly all EE majors. Using the skills we have acquired, we will be able to accomplish the building of the project. The only thing we lack is a bit of experience in mechanical aspects when it comes to drafting and designing a mechanical body, but we have the drive to learn more about it.

List advanced courses (ECE electives plus other relevant courses) that are directly related to the proposed project.

- Computer Communications – project will have GPS signals transmitting to another server, as well has transfer files to another source when given the command.
- Cryptography - project will consist of trustworthy circuit designs which includes protection of the hardware platform against tampering and the unauthorized extraction of information.
- Intro to Robotics - project will have feedback control laws for devices accurate tracking and algorithms to process sensor data collected by device.
- Embedded Systems - project will be using processors, chipsets, buses, and I/O devices.
- CS Computer Vision - will use methods for tracking, boundary detection of the device.
- Integrated Circuit Fabrication – device will utilize an integrated circuit.
- Intro to Nanotechnology – device will consist of microelectronics and nanotechnology in wearable technology.
- Design Fundamentals – project overview will follow the same design processes and major deliverables.

CmpE Majors: Additional Information (REQUIRED)

If the proposed project will include CmpE majors, both the overall project topic and their individual contribution must involve both hardware and software elements, including interactions and/or trade-offs. If some student(s) effort will be primarily focused on only one of these, that effort must involve close interaction with and dependence on design decisions in the other aspect.

Briefly describe how the proposed project satisfies these requirements (200 - 500 characters):

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Brief Project Description

The overall project topic must constitute a significant culminating design experience appropriate to the major(s), experience, background, and advanced courses (e.g., electives) of the participating students.

Today, it is normal for women to be hyperaware of their surrounding areas as they navigate through a mundane and unpresuming life. It is also the norm for women to buy pepper spray, pocketknife, brass knuckles, etc. to keep themselves safe. However, all of these products are hard to use at the same time and sometimes are clanky and obvious to a potential attacker. If there was a situation where a women has been overtaken and is at a last resort, that is where our product will come in. We hope to make a product for women that is concealable but powerful enough to shock the attacker and provide another level of comfort for people using the product.

We plan to use our Electrical Engineering skills to build either a circuit similar to the shocking gum or a circuit that is implemented in tasers. At the same time, using embedded design systems, IC fabrication, intro to nanotechnology, computer communications, and cryptography, we will fabricate a piece of jewelry that will be used as both a brass knuckle and a taser all in one.

Using computer communications, we will be able to hopefully implement a GPS tracker that will monitor the user's movement and provide that location to the 5 emergency contacts and if they are in danger, send that location and description of the victim to the police. We want to provide a secure network that won't be tampered into and provide GPS tracking for the user even if wifi or data is lost. Also using cryptography, we plan to secure our device so that way it cannot be reversed engineered. For IC fabrication, we can use that to build some parts in the device that require it and nanotechnology will help us with the smaller scaled items that will need to be inside the small jewelry case.

Additional Comments (OPTIONAL)

Provide any additional information that you think will be helpful to your ECE 4871 faculty instructors about this project (600 characters max):

Save this Form, and Email Your Files

Save this form as a Microsoft Word document so that you can edit it, if needed. When you are ready to submit your file, save a copy of the form as a **pdf** file using the "Save As" function. Name it as specified below.

Name the file as follows:

LastName_FirstName_Proposed_Project.pdf

For example, George P. Burdell would name his proposed project file as: Burdell_George_Proposed_Project.pdf

Lastly, submit your file via Canvas and email to: Bruno.Frazier@ece.gatech.edu