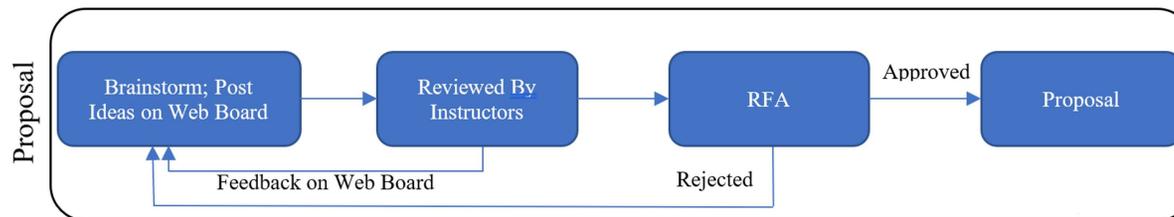


Preparing an RFA

Importance of the RFA

- The RFA sets the criteria for a successful project
- Getting project approved early will give you extra time to design, build and research
- Defining the right scope in the RFA will help you balance work and life during the stressful semester
- It's the first team assignment of the course, so an opportunity to build your teamwork skills (teams of 3)



!!!! Consequences of lagging behind !!!!
!!!! and resources for seeking help !!!!

- If you haven't got project approved by the 3rd week...
 - Although you seem to have only lost 5/~500 points...
 - You will have little time left to get an RFA approved, and the proposal is due in the 4th week, worth 25 /~500 points
 - The effect is progressive, time for later tasks will be shortened
- If you haven't got project approved by the 3rd week...
 - Talk to TAs and professors to clarify the scope (use office hours)
 - Talk to different project sponsors
 - Join approved teams
 - We will help you succeed but don't wait until the last minute

Project Ideas

Best Practices

Define the Problem

"A problem well-stated is a problem half-solved." ~ Charles Kettering

- Motivate your problem (i.e. why should we care?)
- Limit scope and restrict focus
 - Be mindful of the course schedule and available resources
- When is the problem solved?
 - You satisfy all defined sensible constraints
 - You show improvement over previous efforts to solve the problem

Solve the Problem

- Be aware of alternatives, and re-evaluate your design regularly
 - Is there a better or more efficient way to accomplish your project's goals?
 - Can your problem be solved without using ECE approaches?
 - Are you using the best sensors for the job?
 - Is a good commercial solution already available?
- Solve the problem elegantly
 - Make your solution modular
 - Do not solve a simple problem in a complicated way

Project Complexity (Soft Rules)

- Things we are looking for:
 - Printed Circuit Board
 - MCU and chips, not dev board and modules
 - Actuator and Sensors
 - Application of EE or CE course Knowledge
 - circuit implementation
 - software implementation
 - mathematical analysis (signal processing, control theory, EM, etc...)
- Projects are evaluated based on your background
 - What background knowledge and experience do you have?
 - Are you gaining new knowledge and skills during this course?

Submit an Idea

Step 1: Post an idea to the Web Board

HOME GUIDELINES LAB RESOURCES PACE MENTORS SPONSORS ECE 445 I
Logged in as Jacob Bryan

Manage Course
Manage Users
Manage Projects
Manage Events
Manage Calendar
Manage Sponsors
Manage Awards
View Schedules
Student Status
Reserve Bench Time
My Project
My Schedule
My Profile
Sign up for team presentation
Sign up for peer reviews
Web Board
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WEB BOARD

Select term: Show all/read: Type:

[Post new topic](#)

Topics	Type	Replies	Date Created	Last Reply
Testing Sorting by Breedon Salz	Note	1	8/21 1:27p	8/26 9:28p
TA Introductions by Jacob Bryan	Note	10	8/21 6:27p	8/27 2:39p
Welcome to the ECE 445 web board by Scott Carney		2	8/23 7:17p	8/27 8:07p
Digital currency payment solution for vending machines by Scott Carney	Idea	3	8/24 10:21a	8/26 8:36p
Automatic Scream Detection by Nikita Parikh	Idea	6	8/24 12:09p	8/30 9:40a
Title: A low-cost, mobile, multichannel electro tactile simulation system for sensory substitution in upper limb prostheses by Aadeel Akhtar	Idea	5	8/25 12:06a	9/16 5:14a
Small Satellite Projects (LAICE) by Gary Swenson	Note	8	8/25 12:05p	8/27 4:24p
+ Irrigation Controller by Adam Brakhane	Idea	15	8/25 4:48p	10/19 1:05p
Electronic Leak Detector by Adam Brakhane	Idea	2	8/25 5:02p	9/8 12:46a
Paparazzi Hat/Flashback by Thomas Galvin	Idea	1	8/25 5:16p	8/25 10:36p
Solar Charger for Data Collection Hub Monitoring Wireless Sensors by John Hart	Idea	0	8/25 6:27p	
Keyless lock using Distributed Authentication by Milan Dasgupta	Idea	3	8/25 6:37p	8/26 8:46p
Noise Cancelling Window Frame by Willie Wang	Idea	11	8/25 6:39p	9/3 6:31p
Cast2I by Ashley Moy	Seeking Partners	9	8/25 8:04p	9/4 3:22p

Click on

[Post new topic](#)

Step 1: Post an idea to the Web Board, cont'd

Describe your idea here

- Manage Sponsors
- Manage Awards
- View Schedules
- Student Status
- Reserve Bench Time
- My Project
- My Schedule
- My Profile
- Sign up for team presentation
- Sign up for peer reviews
- Web Board**
- Log Out

Search Post new topic

Topics	Type	Replies	Date Created	Last Reply
TA Introductions by David Null	Note	0	1/8 9:09a	

POST NEW TOPIC

Title

Type

Content

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Please format your posts using Markdown or the toolbar above. More info available at commonmark.org/help

Step 2: Respond to feedback

HOME GUIDELINES LAB RESOURCES PACE MENTORS SPONSORS **ECE 445** 

Logged in as Channing Philbrick

- Manage Course
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- Manage Projects
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VIEW TOPIC

[Return to topics](#)

KEYLESS LOCK USING DISTRIBUTED AUTHENTICATION

POST TYPE: **IDEA**

Milan Dasgupta  8/25/2015 6:37:52 PM

Hi ECE 445, My name's Milan, I'm a CompE and I have an interest in Distributed systems and computing. My idea is to have a simplistic lock that could allow a user access by a card swipe or rfid. The lock could communicate with a distributed key-value store that could communicate back to the lock whether it should be opened or remain closed. I'd also like to look into having some sort of web interface to this system that could add users, possibly for only a specific amount of time. For example if I go on vacation, perhaps I'd like a neighbour to have access to my house while I'm away.

Scott Carney  8/25/2015 10:20:18 PM

I think I'm probably missing a key point here. That happens. What makes this distinct from available commercial solutions for card entry? Is there something special about the security here? Help me out.

Milan Dasgupta  8/26/2015 4:06:17 PM

My aim would for this application to be used by individuals in residential areas such as dorms, apartments, and houses. I tend to see large organizations such as corporations or universities. This system could be used by many individuals across an area. They could get the device, register their device on a website, and then add users(Which adds values in the distributed key-value store). To my knowledge I'm not aware of any applications out there that work like this for residential areas, but instead need to store all the data locally on the lock and they also tend to cost a bit. After bouncing ideas with a friend, I'm also thinking of making the lock more of an attachment to the door that would turn a padlock. Locks out on the market tend to require modification to the door, which isn't an option for those who reside in dorms or apartments. As far as security goes, I would look to prevent against any sort of attack discussed in ECE 422. I would encrypt any communication between the locks and the key-value store to prevent man in the middle attacks, and I would take the necessary steps to prevent injections on the web interface.

Submit an RFA

RFA Template

- Problem
- Solution Overview
- Solution Components
 - Component 1
 - Component 2
 - Etc.
- Criterion for Success
- Alternatives

Example RFA

- **Problem**

Theme parks, airports, hotels, libraries, corporations, etc., all have general ideas of how many people are on their premises throughout the day or year but they do not know the instantaneous count of people over that area. Better estimates can improve traffic and resource management.

- **Solution Overview**

Our solution for accurately counting individuals entering or exiting an area is a portable battery-powered device which can be mounted above a door frame. It uses ultrasonic and infrared sensors to count individuals crossing the door threshold.

Example RFA (cont.)

Solution Components

- **Sensor Subsystem**

- Passive infrared sensors for detecting a human being about to cross a doorway and trigger ultrasonic sensors
- Ultrasonic sensors for detecting the heights of individuals, whether they are entering or exiting, and determining whether multiple people are crossing the threshold simultaneously

We will use different frequency ultrasonic sensors focused at different angles to gain topology information at different locations simultaneously.

Example RFA (cont.)

- **Processing Subsystem**
 - Internal microcontroller for A/D conversion and initial signal processing (Atmel atmega328)
 - Bluetooth or Zigbee to send data from microcontroller to external server
- **Power Subsystem**
 - Converts standard AC outlet power to required DC voltages for charging batteries, and for sensors, microcontroller, and communications module demands

Example RFA (cont.)

- **Criterion for Success**

Our solution can accurately count groups of people crossing a doorway simultaneously, report counts to a remote server, and last at least one day on batteries.

- **Alternatives**

SensorInsight currently provides a camera-based solution for watching crowds flows over a wide area. Our solution is different because we focus on precisely counting people entering or exiting an area. We seek to build a much cheaper solution than one of *SensorInsight's* high-definition cameras with our mixed sensor module.

Step 1: Enter the RFA on the website*

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Reserve Bench Time
My Project
My Schedule
My Profile
Sign up for team presentation
Sign up for peer reviews
Web Board
Log Out

MY PROJECT

PROJECT DETAILS

Project Title

Project Description

Create Project Proposal

*Start by going to the **PACE** menu and selecting **My Project**

Step 2: Submit the RFA

HOME GUIDELINES LAB RESOURCES PAGE MENTORS SPONSORS ECE 445 I
Logged in as Jacob Bryan

Reserve Bench Time
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Log Out

PROJECT DETAILS

Project Title
Automatic Squirrel Vaporizer

Project Description
A simple megawatt laser system for targeting and vaporizing squirrels.

Input the RFA using the template here

If your project has a sponsor, please selected it below. If your sponsor isn't listed, please contact your professor or TA.

Save

TEAM MEMBERS

Team Member	Email	Phone	Date Added	Action
Jacob Bryan	jdbryan2@illinois.edu		1/23/2017	DX

Add Team Member

Step 3: Incorporate Feedback

- The staff will give you feedback
 - Update your RFA on the [My Project page](#)
 - Check for feedback frequently
 - Respond to your feedback early
- Please submit one RFA at a time for your most promising idea
 - You can have multiple ideas under discussion but just one RFA
- Go to office hours for in-depth discussion of project
- Project Rejected
 - Try again with a new RFA, rejected RFAs usually can't be fixed
- Project Approved
 - Start working on your project proposal and design immediately

Expectations for Idea and RFA posts

	Idea	RFA
Similarities	May work from a project pitch in collaboration	
	May use previous ideas and proposals as inspiration for improvement	
	Do not use previous semesters as guidance for best practices	
	Idea	RFA
Differences	Does not need strict formatting	Follows guidelines for formatting
	Does not need listed partners	Needs listed partners
	Intends to get feedback	Intends to get approved
	No points besides initial post	Graded by meeting approval deadline
	Discusses a potential problem and potential solution	Problem is relevant, solution is well thought out, design is clearly presented

Early RFA Approval Deadline

January 29th 4:45pm

Final RFA Approval Deadline

February 5th 11:59pm