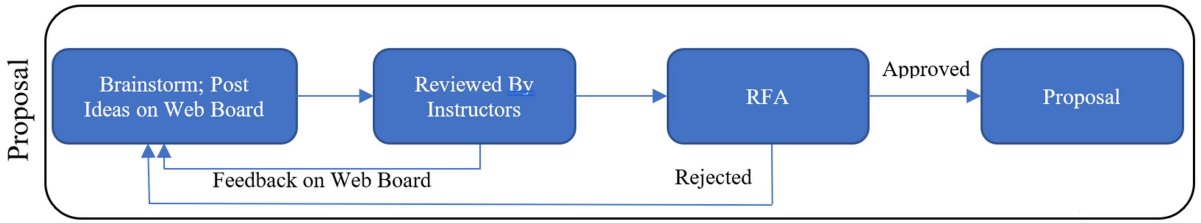
Preparing an RFA

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?

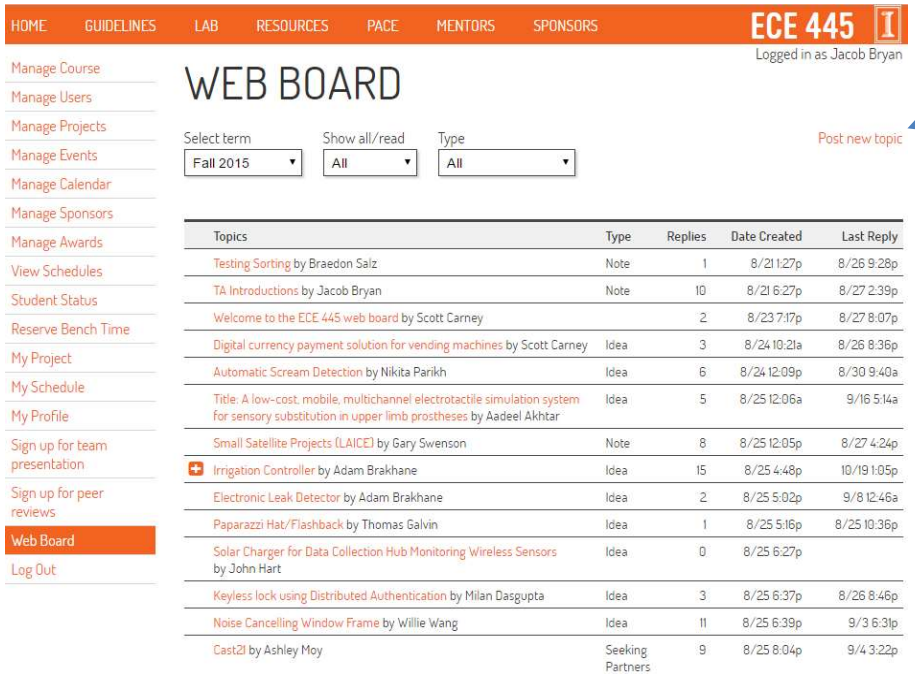
- Solve the problem elegantly
  - Make your solution modular
  - Do not solve a simple problem in a complicated way

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?

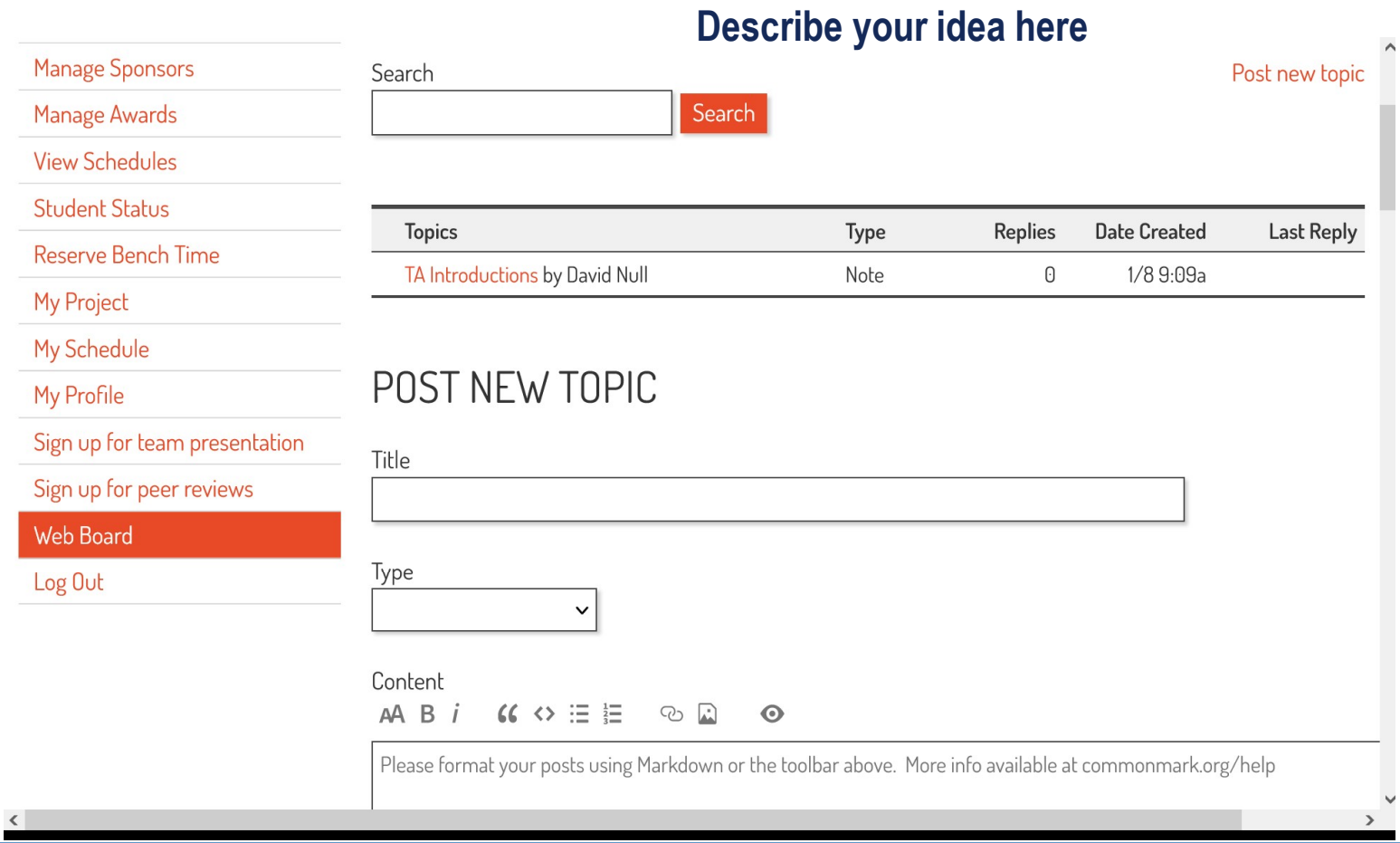
Submit an Idea

Step 1: Post an idea to the Web Board

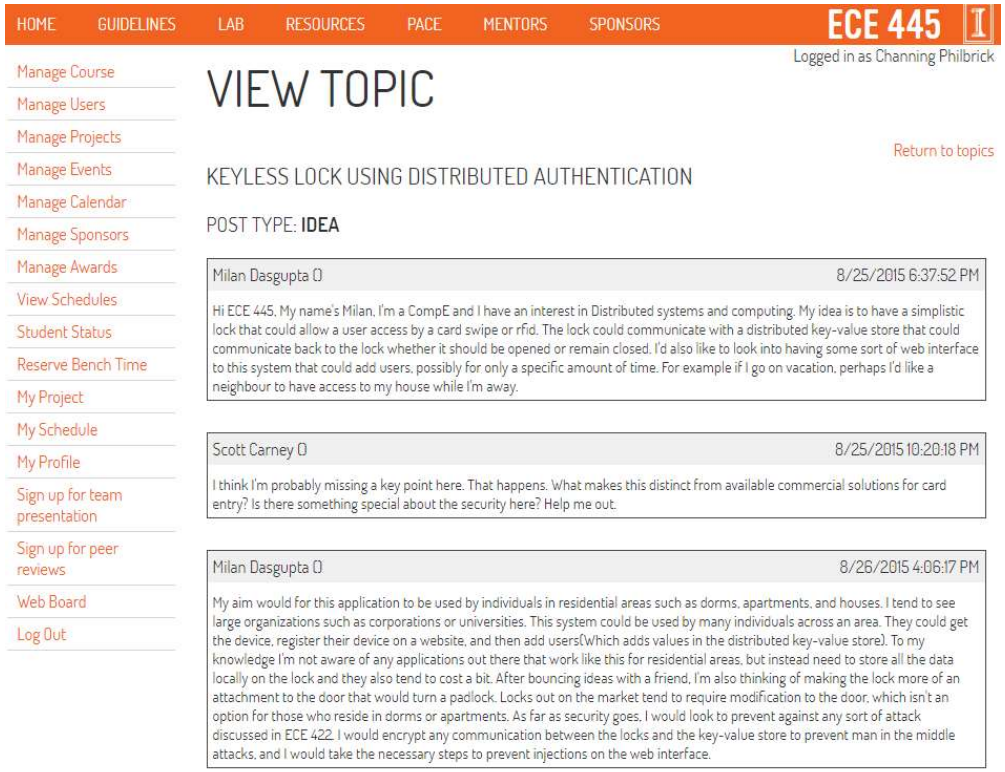


Click on

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



Step 2: Respond to feedback



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.)

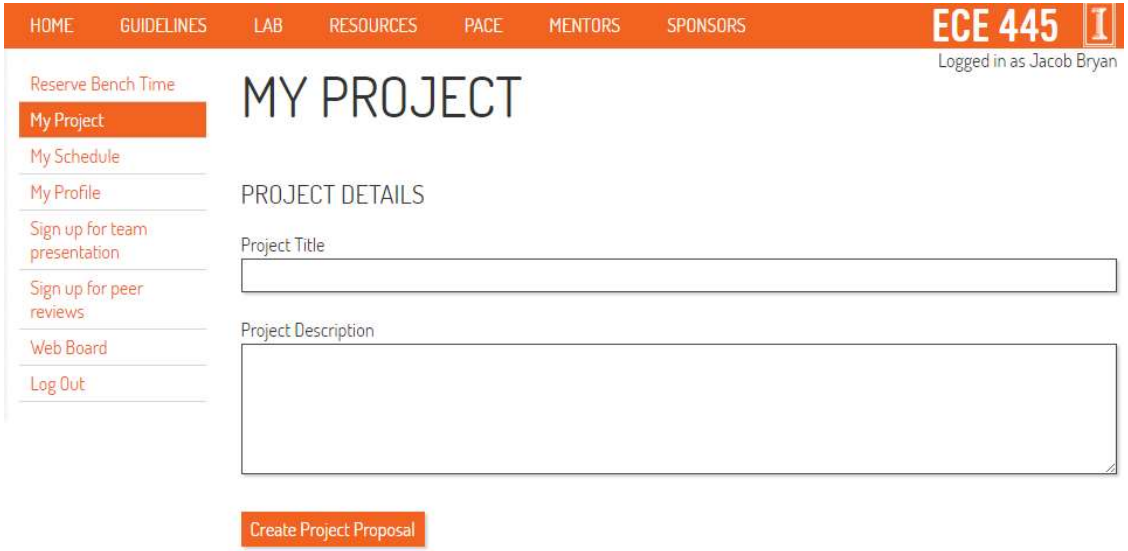
- **Criterion for Success**

  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**

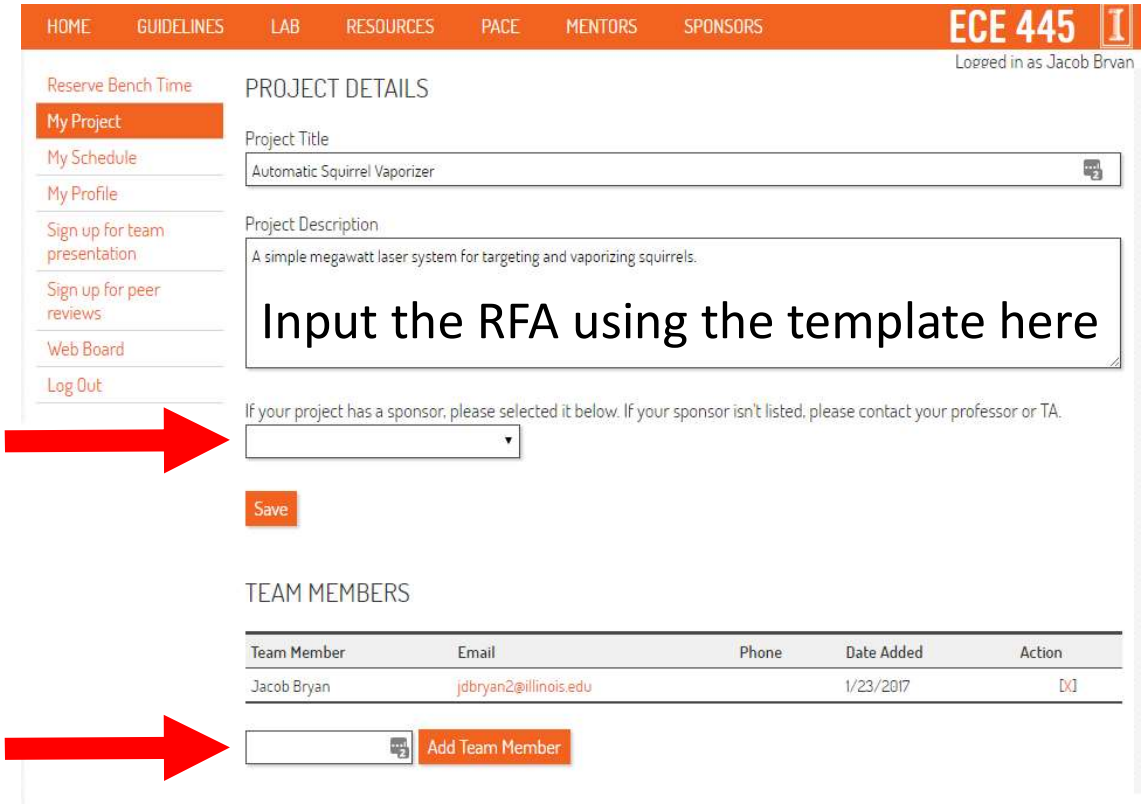
  SensorInsight currently provides a camera-based solution for watching crowds flows over a wide area. Our solution is different because we focus on precisely counting people entering or exiting an area. We seek to build a much cheaper solution than one of *SensorInsight*'s high-definition cameras with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

Step 1: Enter the RFA on the website*



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

Step 2: Submit the RFA



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

Similarities	**Idea**	**RFA**
	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	
Differences	**Idea**	**RFA**
	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