



## Call for Participation

### IEEE Discovery Based Projects

#### For First Year Students of Electrical Engineering, Computer Engineering, and Computer Science

#### 1. Program Description

The IEEE is launching a new program to develop hands-on discovery-based projects for the benefit of first year students in Electrical Engineering (EE), Computer Engineering (CE), and Computer Science (CS).

This call for participation is directed at educators of these students, and is a public invitation to submit project plans for consideration for full development.

#### A three step process

- At this stage we invite project abstracts. The abstracts should briefly describe the technical subject of the project, the general context, and the expected impact.
- Authors of selected abstracts will be invited to develop a project proposal for a project requiring a total of 10-30 laboratory and classroom hours. We expect 30-40 invitations for proposals.
- Authors of selected proposals will be invited to develop a full project implementation. We expect 10-20 invitations for full implementation.

Authors of completed projects will receive an honorarium from IEEE and their work will be disseminated widely through IEEE websites, conferences, and publications.

Table I shows important dates.

Event	Invitation sent	Submission deadline	Response date
Call for project abstracts	15 April 2007	15 June 2007	31 July 2007
Invitation to submit a project proposal	31 July 2007	28 September 2007	9 November 2007
Invitation for full project implementation	9 November 2007	30 May 2008	

Table I: Key program dates.

## 2. Project Description

We seek high quality, hands-on, team-based projects that focus on real-world problems whose solutions can be shown to benefit society.

The projects are expected to make EE/CE/CS significantly more relevant to first year students, and illustrate how the work of professionals might impact society.

The projects should allow students to discover the importance of contemporary EE/CE/CS problems and elicit excitement about creative solutions. They are also meant to demonstrate “how” and “why” technical methods work, and not be mere “recipes.” Underlying complex principles and concepts are expected to be made tractable and provide motivation for further study and engagement.

## 3. Abstract

**Abstract Submission:** A one-page abstract should be submitted electronically by 15 June 2007.

- [1] Project title
- [2] Introduction to the technical problem solved or illustrated by the project
- [3] Impact of the problem’s solution on society
- [4] Description of the hands-on project: what the students will do and what they will discover (including underlying principles and concepts, strategies employed, and trade-offs observed)
- [5] One figure that illustrates the problem/solution.

For an example of an abstract, see

<http://www.ieee.org/web/education/university/RealWorldEngineering/callforprojects.html#abstract>

An abstract may be invited for a project proposal. Invitations will be sent out on or before 31 July 2007.

## 4. Proposal

Authors of selected abstracts will be invited to develop a proposal, to be submitted by 28 September 2007.

The proposal should consist of 5-7 pages and be an extended version of the abstract. In addition, 2-4 PowerPoint slides are requested; they should demonstrate the key principles and show the basic experimental apparatus.

Based on the proposal, 10-20 projects will be invited for full implementation. Invitations for full implementation will be sent out on or before 9 November 2007.

## 5. Full Project Submission

Authors of selected proposals will be invited to develop a full project, to be submitted by 30 May 2008.

**Project Submission:** the full project submission should contain the following documents.

- [1] A **background lecture** (30-40 PowerPoint slides) that motivates and introduces the problem and provides the necessary technical background (for presentation to the students). The impact of the problem's solution on society should be demonstrated and illustrated in the context of a real-world, contemporary application.
- [2] A **student project assignment** (2-3 page document) that recaps the problem and details the hands-on project to be conducted (for distribution to the students who would conduct the project). This assignment must detail what the students will do and what they will discover.
- [3] A **faculty project description** (3-5 page document) that details the hands-on project (for distribution to the EE/CE/CS faculty who would use the project in class). This description must include a description of the resources needed to conduct the project and explicit directions on how to build/assemble the system (if applicable). This description must also include the necessary data, code, or other methods for executing the project. Finally, this description should also describe the expected problems, strategies, trade-offs, and results.
- [4] A **project report solution** (3 page document) that provides an example to the EE/CE/CS faculty of a successful, complete, student project report. The sections of the project report include: problem definition, methods, results, and conclusions. The report should include graphs and data (as necessary), the observed trade-offs, the employed strategies, and what was discovered.
- [5] A **summary lecture** (20-30 PowerPoint slides) that reviews the problem, the methods for solving the problem, the trade-offs and strategies involved in the solution, and what was discovered (principles, concepts, etc.; this is for presentation to the students). The summary lecture should conclude with the reconsideration of the real-world application and its benefit to society.
- [6] Any additional project material needed for complete and proper execution of the project (e.g., data files, software code).

## 6. Review Criteria

The evaluation of submitted abstracts and proposals will employ a peer-reviewed process. This will be a double-blind review process (the reviewers will not know the applicants' identities and the applicants will not know the reviewers' identities). Abstracts and proposals will be reviewed based on three criteria: **relevance**, **quality**, and **discovery**.

- **Relevance:** Does the proposed project address a problem whose solution(s) benefit society? Is the project presented in the context of a real-world, contemporary application? Are these connections made explicit in the proposed project?
- **Quality:** Is the proposed project described in a straightforward, organized, and complete manner? Are the proposed project description and methods accurate, clear, and concise? Is the proposed project tractable for first year EE, CE and CS students?
- **Discovery:** Does the proposed project result in student discovery of an underlying principle or concept? Does the proposed project illustrate strategies and trade-offs that are important in the engineering problem solving process?

## 7. Eligibility

We invite submissions from individuals who are faculty members who teach Electrical Engineering, Computer Engineering, and/or Computer Science at a university that grants degrees in these areas.

Multidisciplinary projects developed by teams of proposers are encouraged.

## 8. Author Recognition

All selected project materials will be made available to educators worldwide through IEEE's education portal [www.tryengineering.org](http://www.tryengineering.org) and will be advertised heavily through IEEE publications such as *The Institute* and *The Interface*.

Upon acceptance of the final project, the principal author will be awarded the following:

- an honorarium of \$5000 US (at the discretion of the principal author the honorarium may be split to several authors);
- a two-year term as a member of the IEEE Educational Activities Advisory Panel;
- an invitation to submit a manuscript describing the project for consideration by the editors of a special issue of the *IEEE Transactions on Education* dedicated to the awarded projects; and,
- an invitation to participate, at IEEE's expense, at a workshop that introduces and demonstrates the projects

Each author of a completed project will receive a plaque and congratulatory letter.

## 9. Submission Instructions

- All submissions will be made electronically at <http://www.ieee.org/web/education/university/RealWorldEngineering/callforprojects.html#submit>
- In order to avoid reviewer bias, it is requested that no personal identification, references to the authors' own work or institutions, or other identifying characteristics be included in the abstract or the proposal. Authors will be asked to identify themselves on a separate form, as part of the abstract/proposal uploading process.
- Narratives should be provided in Microsoft Word or PDF formats. Please use 8" by 11" pages, 1 inch margins on all sides, Times New Roman 12 point font or Arial 11 point font, single spacing.
- PowerPoint slides should have plain, white backgrounds and employ the Arial font style in sizes of 18 point or larger.
- Proposers who are invited to submit full proposals will be requested to adhere to the standard IEEE copyright requirements and sign the standard IEEE copyright form upon submission of the completed project.

## 10. Additional Information

Please the IEEE Real World Engineering Projects at [realworldengineering@ieee.org](mailto:realworldengineering@ieee.org) for additional information or consult the list of frequently asked questions at <http://www.ieee.org/web/education/university/RealWorldEngineering/faq.html>