1 Overview

The Washington EE Department desires to support undergraduate research projects in Electrical Engineering in order to discover new knowledge and produce better educated engineers.

A limited amount of funding is available to support the costs of undergraduate projects. Individual students and teams of students, with the support of a faculty advisor, may request funding through a proposal made to the Undergraduate Research Coordinator. New: Funds may be requested for salary of undergraduates working on research during the summer.

2 Program Details

Eligibility: Individual EE students or teams of EE students may apply. Teams may include students from other disciplines and non-students. Each team must have a designated team leader and a faculty advisor. It is expected that normally the proposal will describe a project for which the student team is enrolled in EE299, 399, or 499, however this is not required.

Funding: A total of $10,000 is available in this round. Individual students may apply for awards of up to $750. Teams may apply for up to $3,000. Exceptions to these limits will be considered for unusual projects if available funding allows. The number of proposals funded will be determined by amount of funding available and the mix of high quality proposals received.

Feedback: Each proposer will receive detailed feedback on the strengths and weaknesses of their proposal.

Project Scope and Duration: Projects must be completed by the end of Summer Quarter 2003. Many times a UG student project is part of a larger research or design project. However, the proposals to the UWEE UGRF should stand alone. The Goal, Significance, and Prior Research sections (see below) may be used to relate the proposed project to a larger one.

Deadlines: Proposals, following the format below, must be received by the EE Dept. Undergraduate Research Coordinator by Friday 23-May-2003. Review will be complete by Friday 30-May-2003, and funding will be available to selected projects by Monday 2-June-2003.

Proposal Delivery: Proposals must be delivered in hard copy form to Karen Fisher (rm M434, EE Building) by 3:30 PM on the due date.

Reporting A final report must be completed by the individual or team receiving the award. The report must be in HTML and be turned in electronically to the EE Department webmaster for linking to the EE Department Undergraduate Research page.

Funding Procedures: Successful proposers will receive an email notice that their proposal is awarded. After Monday 2-June-2003, successful proposers should take a copy of this notice to the EE Department Fiscal Administrator, Tom Jones, tjones@ee.washington.edu, 206-616-5819, rm 253D EE1, to initiate the funding. The student recipient is responsible for correctly following all administrative and fiscal procedures for the funds, as determined by the Fiscal Administrator.
3 Selection Process and Criteria

3.1 Process

The proposals will be reviewed by a panel consisting of 3 faculty members and a student representative selected by the Undergraduate Research Coordinator. The panel will evaluate the proposals and recommend a sub-set of them for funding by the Department consistent with the amount of available funds. Each proposal will be assigned one of the following ratings:

**Exceptional** Extremely professional work, beyond what is expected of strong undergraduate work. Perhaps this should be sent to an outside sponsor.

**Excellent** Very strong proposal by all criteria. Should be funded.

**Very Good** Strong proposal by all criteria. Should fund if possible.

**Good** Good work, but contains one or two identifiable weaknesses.

**Fair** Contains some good ideas but has serious weaknesses.

**Poor** The rest!

All proposal teams will receive feedback on the strengths and weaknesses of their proposal. The scoring form used by the committee is attached on page 6.

3.2 Criteria

The panel will rate the proposals according to the following criteria. All criteria will receive equal weight.

**Technical Merit** How interesting is the idea? What is the potential significance to technology, science, or art if this project is successful? Is the theory correct or does it contain errors? Does the proposal review what work has been done by others related to the project?

**Planning** How well have the proposers planned the project? How realistic is the technical approach, schedule, and budget? Does the schedule and budget fit the requirements of this program?

**Student Development** What is the impact of this project on the education and professional development of this student or student team?

**Proposal** How well written is the proposal? Does it represent professional technical communication? Is it clear and easy to read? Has grammar, spelling, and punctuation been carefully checked? Does it have good clear illustrations? Is it convincing?

**Important:** Are sources properly cited for all material not originally created by the team? It is expected that proposals will be written primarily by the student or student team. Advisors and mentors may edit and proofread the proposal but not write it.

4 Proposal Format

Part of the objective of this program is to promote student skills in planning, technical writing, and persuasion. Therefore a professional, high quality proposal, strictly following the rules below, is required. Proposals not following this format will not be reviewed.

4.1 Fonts and General Format

**Page Limit:** 6 pages, including title page, not including bibliography and appendix required for travel.

**Page Numbering:** Consecutive page numbers must appear at the bottom of each page.

**Margins:** 2.5cm (1in) on all sides of paper.

**Font Size:** 12pt Times or Helvetica font.

**Line Spacing:** 6 lines per inch.

**Graphics:** Figures which illustrate your points are encouraged but must be included within the page limits. Color may be used but is not required.
4.2 Required Outline and Page Limits

Page limits represent a maximum. Shorter proposals are acceptable if they are convincing and complete.

1. Title Page. See sample at end of this document.
   All proposals must have the signature of a faculty advisor. The advisor certifies that s/he will supervise the project.
2. Goal. (0.5p) Clearly state the goal of the project. What problem will you solve?
3. Significance. (0.5p) Why is this project important?
4. Prior Research. (*p) What research has been done by others that is related to this project. Properly cite all sources by references to the bibliography section.
5. Technical Approach. (*p) Prior Results from your team (if any). What technologies, theories, or computational methods will you apply to the problem?
   * Total page limit for sections 4 and 5 is 2 pages.
6. Work Breakdown. (*p) Divide your project into tasks. For team proposals, identify who is responsible for each task.
7. Schedule. (*p) When will each task be started and completed? Which tasks must be completed before other tasks can start? Show your schedule in graphical form.
   * Total page limit for sections 6 and 7 is 1 pages.
   Although there will be some uncertainty, and schedules may change during a project, make your best guess at this time.
8. Budget and Justification (1p) See sections 4.3 and 4.4.

4.3 Budget

The categories for funding are:

**Supplies and Materials:** Stuff you need to buy that you will use up such as chips, wire, passive components.
**Services:** Services you might need such as machining or PCB fabrication.
**Equipment:** Permanent equipment.
**Travel:** Travel may sometimes be necessary for an Undergraduate Project, for example, for a national competition.
**Other:** Anything else.

The budget must be prepared according to the following format:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Salary</td>
<td></td>
</tr>
<tr>
<td>Supplies and Materials</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>$XXXX.XX</td>
</tr>
</tbody>
</table>

4.4 Budget Justification

Expenditures in each category must have written justification. Criteria for justification are given below:

**Student Salary:** Salary for student time on the project is acceptable for **summer quarter only**. Budget justification for salary must detail in tabular form:

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Hours per week</th>
<th>Hourly Pay Rate</th>
<th>Number of Weeks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane Jones</td>
<td>10</td>
<td>$12</td>
<td>10</td>
<td>$1200</td>
</tr>
<tr>
<td>Tom Teammember</td>
<td>5</td>
<td>$12</td>
<td>5</td>
<td>$300</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$1500.00</strong></td>
</tr>
</tbody>
</table>

If hourly rates are not the same for each student, justify.

**Supplies and Materials:** List types of items and how much they cost. You do not need to go down to the level of specific components, but any individual part costing over $50 should be listed. For example, you might say:
Passive Components: $200.00
ICs: $50.00
MX90702 Fragilator Chip: $79.50

Your budget request for Supplies and Materials must be in line with the scope of the proposed project.

**Services:** Estimate amount and cost of such services. You will need to get an estimate from a vendor or talk with someone who has recently used such services. Example:

- **Machining:** 3hrs @ $60/hr $180.00
  (Estimate from Niel Warren, Warren Tool (360-308-6698))

- **PCB Fab:** 10in^2 PCB $250.00
  (Based on Prof Mamishev’s recent PCB purchase from Pacific Circuits)

**Equipment:** It is normally expected that UG research projects will have access to all the equipment they need from existing sources in research or teaching labs. If you request funding for equipment, explain what will happen to it after your project is over and how it will continue to benefit Undergraduate Research in the Department.

**Travel:** If travel is necessary for your project it must be specifically detailed based on specific airfares. Attach web printouts (not included in page limits) from travel sites to the end of your proposal to justify costs. Example:

- **Travel:**
  - **Jane Doe**
    - Airfare: Seattle -> Tucson $207
    - Southwest Airlines flt #471, 2wk advance purchase.
    - Car Rental for Team, Alamo sub-compact: 2days $82
    - Hotel (2 students per room) $160
  - **Bob Builder**
    - Airfare: Seattle -> Tucson $207
    - Southwest Airlines (see above)

  Jane and Bob are both required to support the robot at the National Competition. Jane is responsible for Hardware and Bob is responsible for Software. Both require support during the competition. Car rental is required because heavy equipment must be transported from airport to competition site. Jane and Bob will share car rental and hotel room to save costs.

  (Jane and Bob are married!)

**Other:** Give appropriate justification for necessary items which do not fit the categories above.
Proposal To Department of Electrical Engineering Undergraduate Research Program

Title:

Title of Project

Date Submitted

Team:

Jane Doe, Team Leader
janedoe@ee.washington.edu
Bob Builder
bobb@ee
(other team members)

Faculty Advisor:

Professor Albert Einstein

-----------------------------------------------------------
Signature of Faculty Advisor       Date

Abstract

One paragraph summary of the project.
Undergraduate Research Proposal Evaluation Form

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very Good</th>
<th>Excellent</th>
<th>Exceptional</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Merit</td>
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<td>Planning</td>
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<td>Student Development</td>
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<td>Proposal</td>
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</table>

Committee Comments and Suggestions for Improvement: