IEEE AP-S Student Design Challenge 2011: Radiation Patterns on a Budget

Travel to the 2011 IEEE Antennas and Propagation Symposium
Win $1500, $750, $250

Join the 2nd IEEE AP-S Antenna Design Challenge! Build a measurement system that can be used to measure the gain and radiation pattern of an antenna. The top three teams will receive up to $2,500 in travel funds to attend the IEEE Antennas and Propagation Symposium in Spokane, Washington, USA, July 3-8, 2011 to demonstrate their working systems. From these top teams, the first, second, and third place winners will be announced at the 2011 IEEE AP-S Awards Banquet at the symposium and will receive cash prizes of $1500, $750, and $250, respectively.

The important deadlines are **January 30, May 2, and May 13, 2011**. See the Application and Review Process below for details.

Goals and Specifications:

- Design a measurement system that can be used to find the gain and radiation pattern of a test antenna. An anechoic chamber is not required, so inaccuracies due to reflections by nearby objects are inevitable. However, a reasonable argument must be presented that the gain measurement accuracy would be ±0.5 dB in an anechoic environment.
- The system must be safe and durable, easily reproducible by others, inexpensive, and portable so that it can be demonstrated at the symposium.
- The system must operate at 2.4 GHz, generate its own signal, have its own power supply, and fit on a table or two closely spaced tables. Readily available software (e.g., student versions of C, Matlab, Visual Basic, LabView) or free software packages may be used.
- The total cost for reproduction of the system must be **less than $1,500**. All equipment and software (except for a computer, if needed) must be included in the budget. The use of a computer is allowed and does not have to be included in the $1,500 budget.

The Application and Review Process:

1. All applicants must submit a preliminary design by **January 30, 2011**. It must include:
   a. Full contact information for all team members, including e-mail addresses, surface mail addresses, the name of team's institution, and at least one phone number.
   b. A proposal limited to two pages and in 12-pt Times New Roman font that contains
      i. A detailed description of the system to be built.
      ii. The steps that will be taken to ensure the accuracy of the system.
      iii. A bill of materials (up to $1,500).

    c. A letter from a professional mentor such as a professor or engineer in industry indicating agreement to supervise the project. The mentor must be an IEEE AP-S member and must verify that all members of the team are full-time graduate and/or undergraduate students at a university, college, or technical school.

All materials must be integrated into a single pdf file named TeamName.pdf in the order listed above.

2. The Design Contest Committee will assess each preliminary design based on creativity, likelihood of achieving the design goals, and quality of written materials. Six semi-finalist teams will be selected by **February 11, 2011** and will receive $1,500 each to build and test their designs.

3. Each of the six semi-finalist teams must submit a final report by **May 2, 2011** as a pdf file using the IEEE standard paper format available at the IEEE web site. The report must be limited to 10 pages (excluding the software listings, if any) and must include:
    a. A detailed description of the system, including schematic and other key diagrams.
    b. A list of parts and materials required, including where to obtain them and costs.
    c. Photos of the final system, including a scale to show the sizes of key components.
    d. Assembly and operating instructions for the system.
    e. A set of measurements obtained using the system with an example test antenna.
    f. Biographies (100 words or less each) and photos of all design team members.
    g. All software necessary to build and/or operate the system in a separate file(s).

4. Each of the six semi-finalist teams must prepare a video demonstration of the working system by **May 13, 2011**. Submission instructions will be provided at that time.

5. The Design Contest Committee will assess each semi-finalist's design based on creativity, completeness of the report, functionality of the system as determined by the video, and quality of written materials. Three finalist teams will be selected by **June 1, 2011** and will receive stipends of up to $2,500 per team to travel to and attend the IEEE AP-S Symposium. The stipend is intended to cover equipment shipping costs and all of the travel expenses for one team representative; however, it may be divided among multiple team members.

6. The finalists will be expected to demonstrate their working systems during the symposium and attend the Awards Ceremony at the banquet. Tables, AC power, and multi-outlet power strips will be provided at the symposium. Each team is responsible for bringing all other necessary equipment for a successful demonstration.

7. A specially designated committee will judge the final demonstrations and select the first, second, and third prize winners to receive $1,500, $750 and $250, respectively. The prize winners will be announced at the AP Awards Banquet at the symposium.

How to Submit Materials:

Send all materials to designcontest@ieeeaps.org with the subject line "2011 IEEE AP-S Design Contest Submission." Questions may be sent to the same address. All submitted materials must be in pdf format according to the guidelines above.