

# **Student EMC Hardware Design Competition Announcement**

The EMC Society would like to invite students currently enrolled in a college or university at either the graduate or undergraduate level to submit a hardware design that demonstrates clear and convincing understanding of a fundamental electromagnetic interference (EMI) or signal/power integrity (SIPI) control methodology or technique. Examples of possible hardware design topics are provided at the end of this description.

Students may enter as individuals or as teams comprised entirely of students. It is expected that all students will be reporting to a faculty member/professor. Individual or team entries are limited to one team per faculty member/professor. The faculty member/professor advising the students must submit a letter or email verifying the submitted design is the original work of the students.

Entries are limited to two teams per school. Previous year contest winners are not eligible.

Proposals should include a description of the demonstration to be performed with sufficient detail to convey a technical understanding to the chairs of the EMC or SIPI topic to be demonstrated. Entrants are required to submit a brief video recording of approximately 5 minutes that demonstrates a functional design together with any/all measurement activities illustrating the fundamental EMI or SIPI control methodology or technique embodied in the design.

A written report is not required, but may be submitted, that describes how the design conveys a clear and convincing understanding of the fundamental EMI or SIPI control methodology or technique embodied in the design.

All submittals will be judged by a team comprising several EMC Society Education Committee members based on technical design, creativity, and educational merit/value.

Submittals are due NLT 11:59 PM Central Time, 17 April 2020. Acceptance notification will be sent out no later than 27 April 2020.

The winning entry is invited, but not required, to demonstrate their design, together with other EMC professionals who are also performing similar demonstrations, at the 2020 IEEE International Symposium on EMC to be held in Reno, Nevada, USA, the week of 27 through 31 July 2020. Test equipment and audio-visual support can be made available for the use of the winning entry, if a listing of necessary/desired support test and A/V equipment is provided in proposal submittals.

The winning entry will receive a prize of \$900 (USD) and up to \$2,100 (USD) to assist in defraying the cost for one or more team members to attend the 2020 IEEE International Symposium on EMC to be held in Reno, Nevada, USA, the week of 27 through 31 July 2020. The second-place team will receive a prize of \$500 (USD). Award recipients will need to

complete the appropriate US Department of the Treasury Internal Revenue Service forms as required by the IEEE. Travel stipend recipients will need to complete an expense account report for reimbursement.

**Please contact us with any questions:**

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**A partial list of potential hardware topics includes:**

- Application of magnetic pickup loops and current probes
- Transmission-line effects on PCBs
- Coupling and multi-conductor transmission lines
- Use of ferrites for EMI control
- Measurement versus calculation of signal spectra
- Minimizing magnetic field susceptibility
- Measurement and control of EMI in spread spectrum systems
- Measurement of common versus differential mode coupling
- Proper application of LISNs
- Electrostatic discharge phenomena
- Effects of clock frequencies
- Mode stirring
- Electromagnetic leakage through seams and joints
- Electromagnetic product safety
- Signal integrity issues for PCBs
- EMC filters
- Decoupling strategies
- CM in differential signaling
- Non-ideal behavior of components
- SMPS snubber design and effectiveness
- Shielding effectiveness
- Common-impedance coupling

***Note:** Student groups are expected to complete the project largely on their own. Advisors should limit their help to answering basic EMC questions from the students once the project has begun. For example, it is perfectly acceptable to answer a basic question about the importance of controlling the current return path. Suggesting how components might be placed in the contest design problem to better control the current return path, however, might give an unfair advantage. A design review by an advisor or someone outside the group would certainly go too far.*