

## Exploring Power Signatures for Location Forensics of Media Recordings

**At-A-Glance** The IEEE Signal Processing Cup (SP Cup) is to provide undergraduate students with an opportunity to form teams and work together to solve a challenging and interesting real-world problem using signal-processing techniques and methods. The SP Cup was first launched in 2013—2014, and SP Cup 2016 is now the third edition.

The 2016 competition topic is related to a time-varying location-dependent signature of power grids, as it becomes intrinsically captured in media recordings due to direct or indirect influences from the respective power grid (shown in Figure 1 and 2). The topic is at the intersection between signal processing and information security/forensics. Participants are expected to utilize a number of fundamental signal processing theories and techniques at the undergraduate level, and the project involves sensing circuit/hardware that is affordable and easy-to-build as well as algorithm design and software implementation.

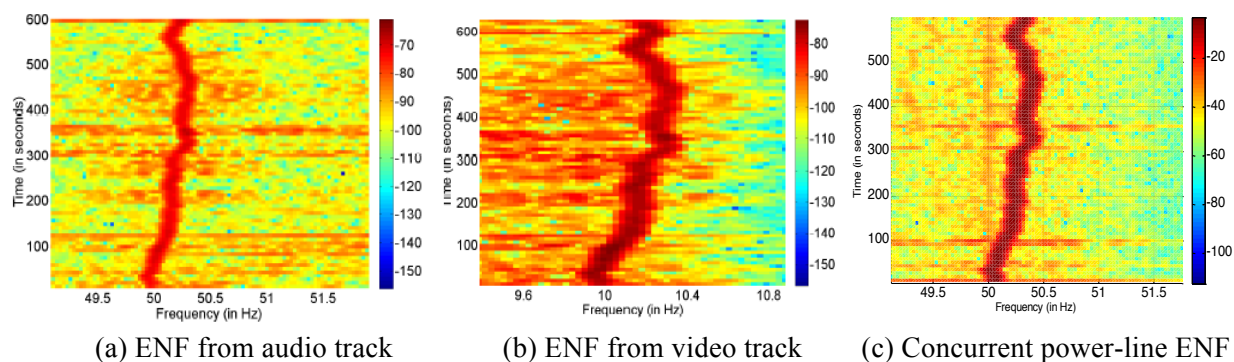


Figure 1 Spectrogram showing electric network frequency (ENF) signals in concurrent recordings of audio recording, visual recording and power main. Cross-correlation study can show similarity between media and power line reference at different time lags, where the peak suggests their temporal alignment.

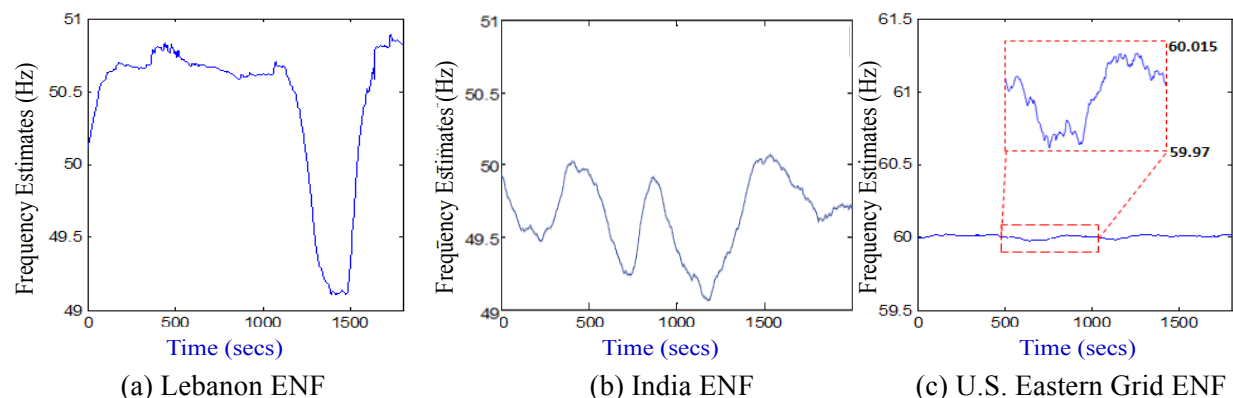


Figure 2 Instantaneous ENF variations over time exhibit different characteristics in grids around the world.

## Call for Participation: IEEE Signal Processing Cup 2016

<http://www.signalprocessingsociety.org/community/sp-cup/>

### Competition Topic: **Exploring Power Signatures for Location Forensics of Media Recordings**

The IEEE Signal Processing Society (SPS) invites you to participate in the Third Annual International Signal Processing Cup (SP Cup) Competition. The SP Cup aims to provide undergraduate students with opportunities to form teams and work together to solve a challenging and interesting real-world problem using signal processing techniques. The 2016 SP Cup will be held in March 2016 at the 2016 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP, [www.icassp2016.org/](http://www.icassp2016.org/)) in Shanghai, China. Three top teams from the preliminary round held before the conference will be selected and invited to present their work at ICASSP 2016, where prizes will be awarded.

All undergraduate students are encouraged to participate. Please feel free to distribute this email to students, friends, and colleagues who may be interested in this competition.

For technical details of the competition project, please visit:

[https://piazza.com/ieee\\_sps/other/sp1601/home](https://piazza.com/ieee_sps/other/sp1601/home)

(General information and resources are available on the Piazza education community platform without requiring a login; to access datasets and references as well as to participate in the community discussions and Q&A, please visit [https://piazza.com/ieee\\_sps/other/sp1601](https://piazza.com/ieee_sps/other/sp1601) to set up a free account and use the **access code “sp1603”** to join as a student to “SP 1601: SP Cup 2016”).

### **Participation in the Competition:**

Each team participating in the competition is to be composed of one faculty member (to advise the team members), one graduate student (to assist the supervisor in mentoring undergraduate participants), and at least three but no more than 10 undergraduate students. At least three of the undergraduate team members must be IEEE SPS members or student members.

Participating teams must submit their projects by 17 January 2016. Each submission should include a report, in the form of an IEEE conference paper, on the technical details of the methods used and the results, as well as the programs developed (such as an executable program or an MATLAB App). More detailed submission guidelines will be posted on the SP Cup web page.

Participating teams must register to join the competition by 10 December 2015. And by 7 February 2016, three finalist teams will be identified to participate in the final competition at ICASSP 2016.

### **Important Dates:**

10 December 2015: SP Cup online registration closes

17 January 2016: Submission deadline for participating teams

7 February 2016: Announcement of the final three teams

20 March 2016: Final competition at ICASSP 2016

### **Team Prizes:**

The champion: \$5,000

The first runner-up: \$2,500

The second runner-up: \$1,500

Each finalist team invited to ICASSP 2016 will receive travel supported by the SPS on a reimbursement basis. A team member is offered up to \$1,200 for continental travel, or \$1,700 for intercontinental travel. A maximum of three members per team will be eligible for travel support.

**Inquiries:**

- General inquiry: [sp-eng-spcup@ieee.org](mailto:sp-eng-spcup@ieee.org)
- Technical questions: please create an account and post your questions through the Q&A tool on the Piazza website (either as a public inquiry to the SP Cup 2016 community or a private message to the organizers). [https://piazza.com/ieee\\_sps/other/sp1601/home](https://piazza.com/ieee_sps/other/sp1601/home), using access code “sp1603” to enroll.

**Organizers:**

The organization of 2016 SP Cup Competition is led by members of the IEEE Information Forensics and Security Technical Committee (IFS-TC), and overseen by the IEEE SPS Student Services Committee.