Cornell University
School of Electrical and Computer Engineering

Information
Systems
Networks
Seminar

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"Improving Synchronization in a Multi-Nodal Recording System by Compensating for the Temperature Dependency in Quartz Oscillators"

Date: 12:00pm, Wednesday March 2nd
Venue: Rhodes Hall 310

Quartz crystal oscillators are practically ubiquitous in modern digital electronic designs, providing timing precision within 30 parts per million (ppm) typically with a temperature dependence on the order of 0.04 ppm/°C². Although this precision is adequate for most digital recording devices, large temperature variations combined with long recording durations can lead to significant accumulated timing errors. Such errors become especially problematic in digital audio recorders used in synchronized arrays for performing localization of sound sources. Monitoring temperature over the recording duration can be used with the parabolic model of quartz crystal oscillator frequency dependence on temperature to reduce the accumulated errors. Using this algorithm to post-process data from recording arrays used by the Bioacoustics Research Group of the Cornell Lab of Ornithology reduces the error associated with the sound source location estimates by an order of magnitude.

Pizza will be served 10 minutes prior to the start of the talk.

Short Bio:

Dr. Harold A. Cheyne II is a research scientist with a background in electrical engineering, acoustics, speech, and hearing. He has authored seven peer-reviewed articles and one US patent, and has served as Principal Investigator of grant awards totaling over $2M since 2002. His past work includes developing a medical voice monitor, a low-cost noise exposure meter, investigating talker-to-listener distance perception, and teaching a masters-level course in speech science. He currently is the Technology Director at the Cornell Lab of Ornithology, where he works on animal vocalization recording and analysis hardware and software to promote conservation efforts.