IRENE Restores Sound From Old Or Damaged Recordings

Lawrence Berkeley National Laboratory

Recorded media is constantly evolving; what was once state-of the-art is now ancient technology.

> ❝ *Media such as wax and plastic cylinders, vinyl discs, and acetate sheets that are more than 100 years old, are usually damaged by scratches or mold, or have pieces missing. Thanks to a new, touchless restoration technology, these older recordings can be fully recovered.*

The "Berkeley Lab Optical Sound Restoration (OSR) System" or "Image, Reconstruct, Erase, Noise, Etc. (IRENE)" system was developed from 2000-2003 at Lawrence Berkeley National Laboratory in Berkeley, Calif., by physicists Carl Haber and Vitaliy Fadeyev. More than $600,000 in combined funding was provided by the Library of Congress and the National Endowment for the Humanities.

Current restoration techniques would damage or destroy this historic media, but Berkeley's technology recovers audio data without any physical contact with the fragile discs and cylinders. The OSR System is the first technology to

provide non-contact restoration of recording on all types of mechanical sound carriers. The system produces either two-dimensional or three-dimensional optical digital images, creating a map of the entire groove profile of a disc or cylinder. Computer algorithms emulate the stylus motion, select undamaged portions of the groove, and reconstruct the audio waveform.

Because it is "touchless," the lack of physical contact prevents any further damage to the older materials. The inventors are developing a customized machine for the Library of Congress and are working with the University of California's Phoebe Hearst Museum of Anthropology to reconstruct sound from wax cylinders that capture the spoken word and songs of endangered Native American cultures. The hope is that the digitally restored recordings will help language institutes revitalize these cultures.

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