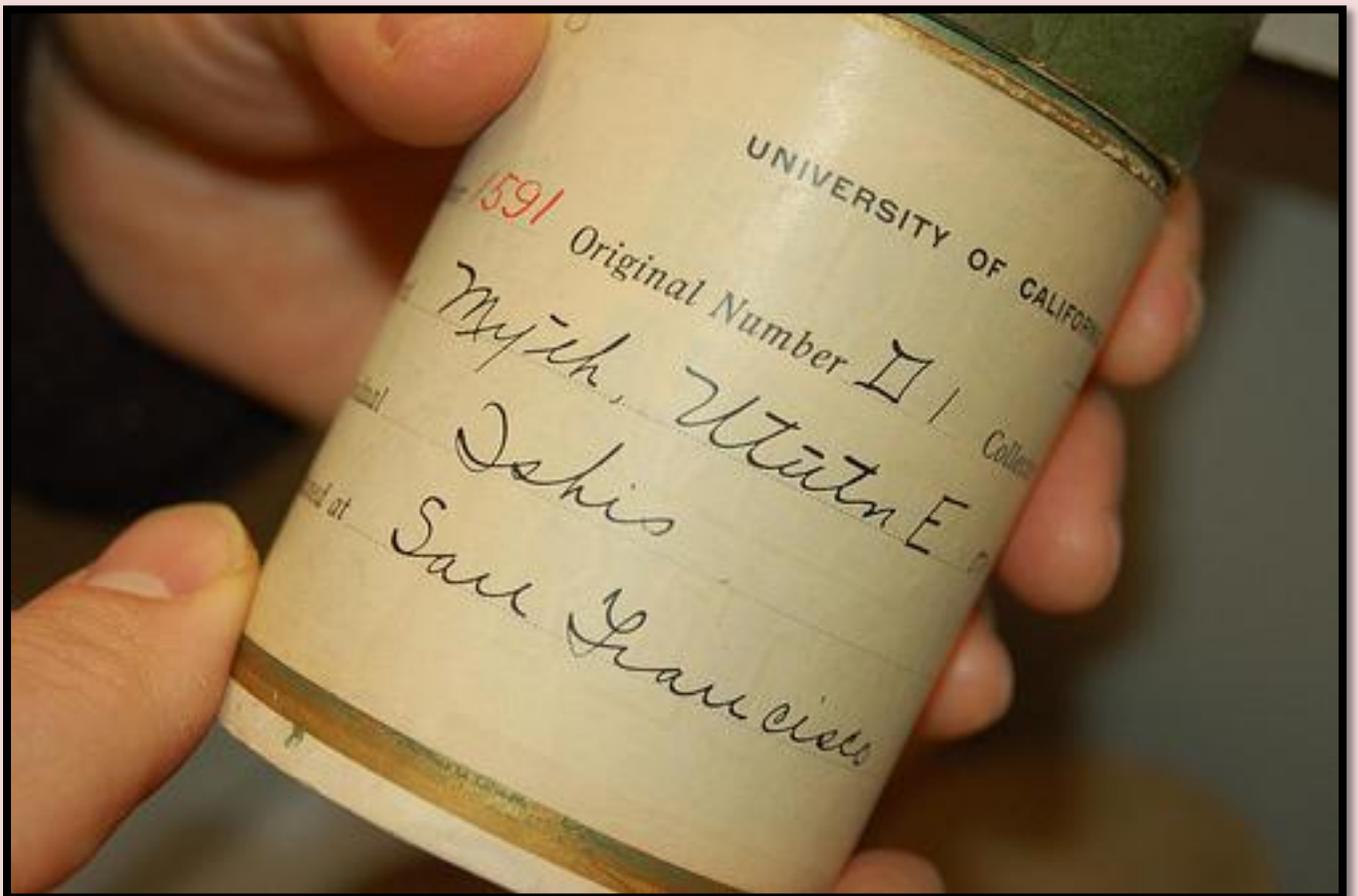


**Examples and Background Information**  
**from the**  
**University of California at Berkeley**  
**Phoebe Hearst Museum of Anthropology**  
**Sound Recordings Restoration Proposal**

Last Update 16-September-2014

UNDER CONSTRUCTION



The Museum has the largest sound collection in an American anthropology museum. One of the largest and oldest ethnographic sound collections in the country, it is the largest and most comprehensive sound collection for California Indian song and language, and the third largest ethnographic wax-cylinder collection in America (2,713 items, produced 1901–38). There are also important holdings from Africa and Asia.

The image shows the container holding a wax cylinder recording collected by Prof. Alfred Kroeber and associates around 1912.

The purpose of this website is to provide examples and background information relevant to a proposed project to preserve and create access to the wax cylinder collection using non-contact optical scanning methods developed at Lawrence Berkeley National Laboratory (LBNL).

- *General reference to the LBNL Optical Sound Restoration Project is at <http://irene.lbl.gov/>*
- *Short project description [Handout-LBNL-2013.pdf](#)*
- *Longer project description [Sound-Project-0513.pdf](#)*
- *Public presentation (large pdf) <http://irene.lbl.gov/Harvard-April-2012-public.pdf>*
- *Additional details on the technical methods can be found in [3D-Scanning.pdf](#)*
- *A variety of examples is posted at: <http://bio16p.lbl.gov/2013-examples.html>*

Audio recorded on cylinders in the collection were transferred to magnetic tape in 1975. This was an analog transfer process using whatever technology was available at that time. In fact little is known about the actual procedure used. A key aspect of the present proposal is to repeat this transfer process using modern optical methods which offer additional noise reduction and restoration.

### **Example 1 of cylinder from the collection.**

This is the audio from a transfer performed before 1975: [PHMA\1596-PHMxfer-Raw1.wav](#)

This is the audio from an optical transfer done in 2012: [PHMA\1596\\_Ishi-HardFIR.wav](#)

### **Example 2 of cylinder from the collection**

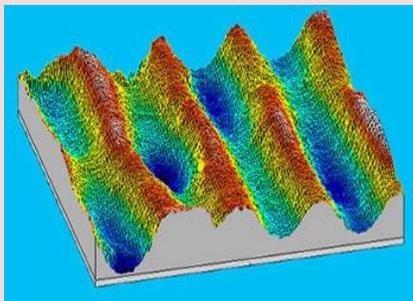
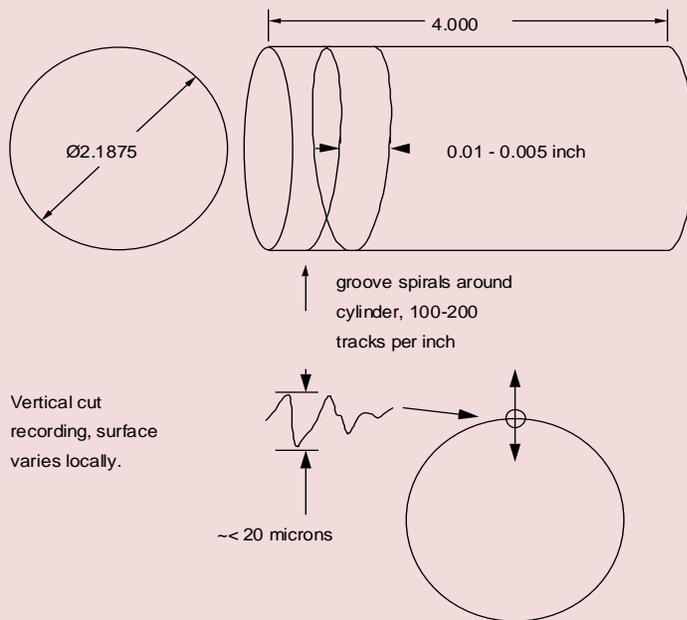
This is the audio from a transfer performed before 1975: [PHMA\1713-PHMxfer-raw.wav](#)

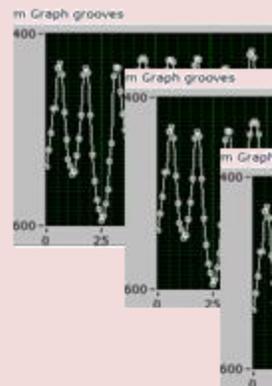
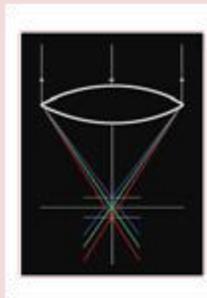
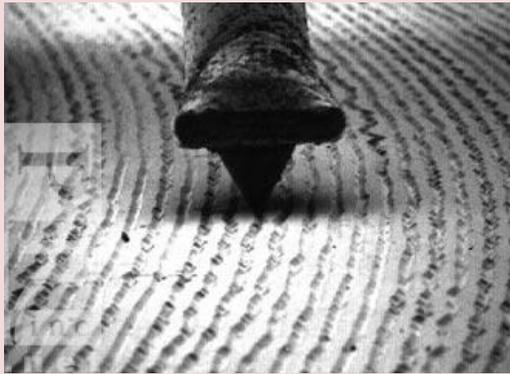
This is the audio from an optical transfer done in 2012: [PHMA\1713-full2\\_Ishi-HardFIR.wav](#)

**What's going on here?**

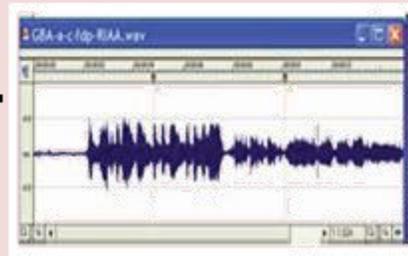
The traditional way to transfer a sound recording is to use a physical stylus on the groove. In this process you must make physical contact to the material. This can cause further deterioration. If the recording is already damaged or compromised the result can be very distorted and further digital clean-up may be difficult.

The optical process proposed for use here instead creates a very high resolution picture of the record. This picture is the ultimate preservation copy of the record. This picture can also be processed to identify the damaged or compromised regions and these can be removed from the image through a numerical algorithm.

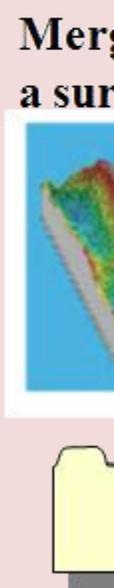




**Create audio waveform:**

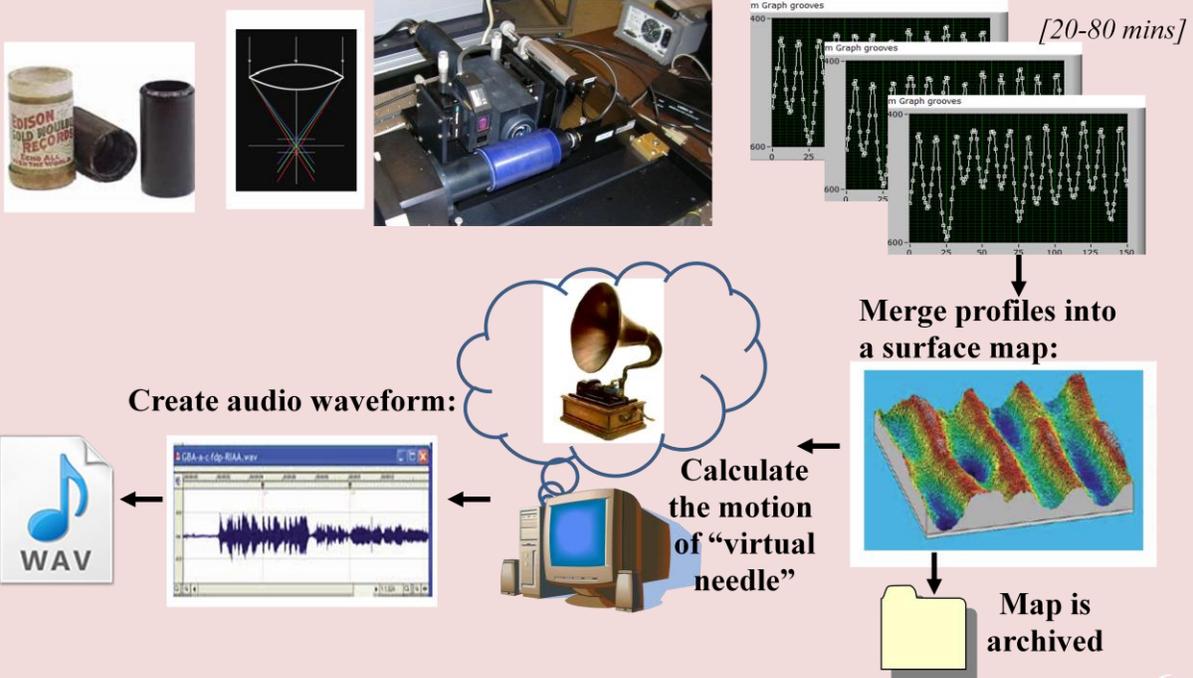


**Calculate the motion of "virtual needle"**



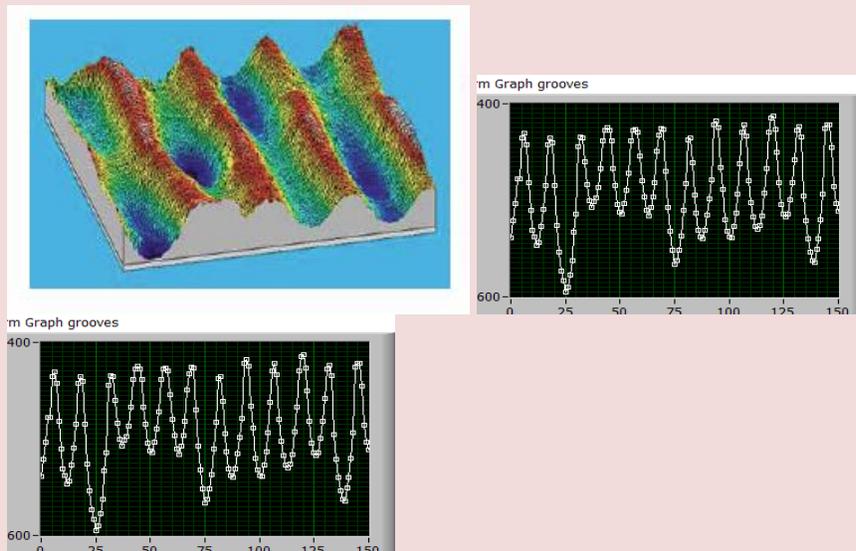
# Basic 3D Scanning Process

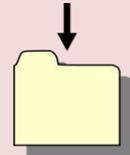
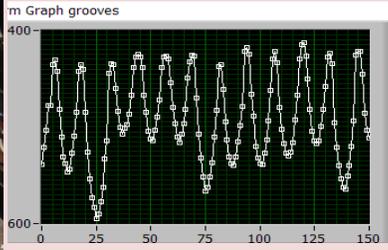
Use High-resolution optical probe to create depth profiles of the surface:

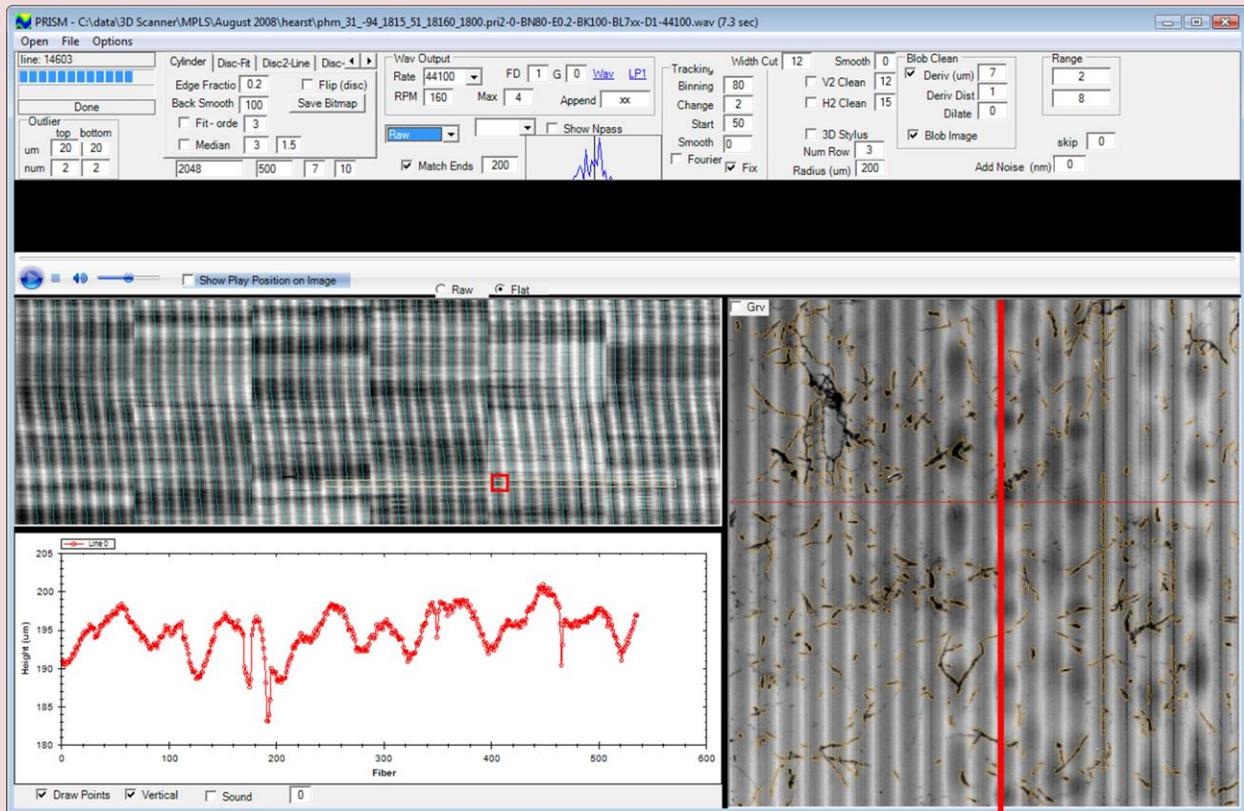


A Century of Ishi: M.Barrios

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In case of questions or issues with this website, please contact:

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