NATIONAL ENDOWMENT FOR THE Humanities

OFFICE OF DIGITAL HUMANITIES

Narrative Section of a Successful Application

The attached document contains the grant narrative and selected portions of a previously funded grant application. It is not intended to serve as a model, but to give you a sense of how a successful application may be crafted. Every successful application is different, and each applicant is urged to prepare a proposal that reflects its unique project and aspirations. Prospective applicants should consult the Office of Digital Humanities application guidelines at http://www.neh.gov/grants/odh/institutes-advanced-topics-in-the-digital-humanities for instructions. Applicants are also strongly encouraged to consult with the NEH Office of Digital Humanities staff well before a grant deadline.

Note: The attachment only contains the grant narrative and selected portions, not the entire funded application. In addition, certain portions may have been redacted to protect the privacy interests of an individual and/or to protect confidential commercial and financial information and/or to protect copyrighted materials.

Project Title: Institute for High Performance Sound Technologies for Access and Scholarship (HiPSTAS)

Institution: University of Texas, Austin

Project Director: Tanya Clement

Grant Program: Institutes for Advanced Topics in the Digital Humanities

Description

In August 2010, the Council on Library and Information Resources and the Library of Congress issued a report titled *The State of Recorded Sound Preservation in the United States: A National Legacy at Risk in the Digital Age*. This report suggests that if scholars and students do not use sound archives, our cultural heritage institutions will not preserve them. Librarians and archivists need to know what scholars and students want to do with sound artifacts in order to make these collections more accessible; as well, scholars and students need to know what kinds of analysis are possible in an age of large, freely available collections and advanced computational analysis. To this end, the School of Information at the University of Texas at Austin and the Illinois Informatics Institute at the University of Illinois at Urbana-Champaign propose to host two rounds of an NEH Institute on High Performance Sound Technologies for Analysis and Scholarship (HiPSTAS). Humanists interested in sound scholarship, stewards of sound collections, and computer scientists and technologists versed in computational analytics and visualizations of sound will develop more productive tools for advancing scholarship in spoken text audio if they learn together about current practices, if together they create new scholarship, and if they consider the needs, resources, and possibilities of developing a digital infrastructure for the study of sound together.

If funded, HiPSTAS Participants will include 20 humanities junior and senior faculty and advanced graduate students as well as librarians and archivists from across the U.S. interested in research in the spoken word within audio collections. The collections we will make available for participants include poetry from PennSound at the University of Pennsylvania, folklore from the Dolph Briscoe Center for American History at UT Austin, speeches from the Lyndon B. Johnson Library and Presidential Museum in Austin, and storytelling from the Native American Projects (NAP) at the American Philosophical Society in Philadelphia. Sound archivists from UT at Austin, computer scientists and technology developers from I3 at Illinois, and representatives from each of the participating collections will come together for the HiPSTAS Institute to discuss the collections, the work that researchers already do with audio cultural artifacts, and the work HiPSTAS participants can do with advanced computational analysis of sounds.

At the first four-day meeting ("A-Side"), held at the iSchool at UT in May 2013, participants will be introduced to essential issues that archivists, librarians, humanities scholars, and computer scientists and technologists face in understanding the nature of digital sound scholarship and the possibilities of building an infrastructure for enabling such scholarship. At this first meeting, participants will be introduced to advanced computational analytics such as clustering, classification, and visualizations. They will develop use cases for a year-long project in which they use advanced technologies to augment their research on sound. In the interim year, participants will meet virtually with the Institute Co-PI's (Clement, Auvil, and Tcheng) and report periodically on their use cases and ongoing research within the developing environment. In the second year, the participants would return to the HiPSTAS institute for a two-day symposium (the "B-Side" meeting) at which they would report on their year of research. In this second event, the participants will present scholarship based on these new modes of inquiry and critique the tools and approaches they have tried during the development year. This second meeting will end with a day-long session in which the group drafts recommendations for implementing HiPSTAS as an open-source, freely available suite of tools for supporting scholarship on audio files.

Much work has been done on using advanced computational technologies to analyze music and oral traditions, but we believe that those who are interested in spoken text audio collections are underrepresented in these conversations. As a result of the HiPSTAS Institute, scholars and instructors will understand better how to "imagine what they don't know"—how to analyze spoken text sound files with advanced computational analysis—and they will have a window into the advanced research required to build digital humanities infrastructure for new kinds of scholarship. Further, participating collections will have increased the visibility of their holdings and will serve as models for other cultural heritage institutions that seek to make their spoken text audio collections available to high performance sound analysis. It is this point in history, when we have created a large number of high quality and significant digital sound files and are developing ever more efficient means for computational analysis, that gives rise to our proposal to bring together librarians and archivists, computer scientists and technologists, scholars and instructors together to study sound analysis at the HIPSTAS Institute.

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Significance

There are hundreds of thousands of hours of important spoken text audio files, dating back to the nineteenth century and up to the present day. Many of these audio files, which comprise poetry readings, interviews of folk musicians, artisans, and storytellers, and stories by elders from tribal communities contain the only recordings of significant literary figures and bygone oral traditions. These artifacts are only marginally accessible for listening and almost completely inaccessible for new forms of analysis and instruction in the digital age. For example, an Ezra Pound scholar who visits PennSound online and would like to analyze how Pound's cadence shifts across his 1939 *Harvard Vocarium Readings*, his war-time radio speeches and his post-war *Caedmon Recordings* (June 1958) must listen to each file, one-by-one, in order to establish a look at how (or if) patterns change across the collection. An Ojibwe *oshkabewis* ("one empowered to translate between the spiritual and mundane worlds") seeking to teach students about the ways in which an Ojibwe elder uses *Ojibwemowin* ('the Ojibwe language') at culturally significant moments to enhance English descriptions with spiritual elements has few means to map or show students when these transitions or "traditional cultural expressions" (TCE) occur. And a scholar doing research within the Oral History of the Texas Oil Industry Records at the Doph Briscoe Center for American History can only discover the hidden recording of Robert Frost reading "Stopping by Woods on a Snowy Evening" among other poems on Side B. of folklorist William A. Owens' recordings because a diligent archivist included that fact in the metadata.

Not only do scholars have limited access to spoken word audio, but their ability to do new kinds of research (what Jerome McGann calls "imagining what you don't know") and to share these methodologies with colleagues and students is almost entirely inhibited by present modes of access. What other TCE's and important historical moments are hidden in these sound files? What if we could test hypotheses concerning the prosodic patterns of beat poets in comparison to the "high modernists" with over thirty-five thousand audio recordings in PennSound? What if we could automatically detect the difference between poetry and prose to determine when a poem is over and an author is telling us about the poem? Or determine, perhaps, whether and when the Ojibwe storytellers sound like elders from supposedly unrelated tribes? At this time, even though we have digitized hundreds of thousands of hours of culturally significant audio artifacts and have developed increasingly sophisticated systems for computational analysis of sound, there is no provision for any kind of analysis that lets one discover, for instance, how prosodic features change over time and space or how tones differ between groups of individuals and types of speech, or how one poet or storyteller's cadence might be influenced by or reflected in another's. There is no provision for scholars interested in spoken texts such as speeches, stories, and poetry to use or to understand how to use high performance technologies for analyzing sound.

In response to this lack, the School of Information (iSchool) at the University of Texas at Austin (UT) and the Illinois Informatics Institute (I3) at the University of Illinois at Urbana-Champaign (UIUC) propose to host two rounds of an NEH Institute on High Performance Sound Technologies for Analysis and Scholarship (HiPSTAS). If funded, the Institute will include 20 humanities junior and senior faculty and advanced graduate students as well as librarians and archivists from across the U.S. interested in research in the spoken word audio collections. Participants will learn about the state of digital sound preservation and sound studies, will work to advance scholarship that uses advanced computational methodologies and will contribute to a set of recommendations for the development of tools for digital scholarly inquiry in sound.

In some cases, as with the audio collections of the Ojibwe people or of significant poetry performances or recorded in the field by folklorists John A. Lomax, William A. Owens, John Henry Faulk, Americo Paredes, and Mody Boatright, the sound files are the only texts of study for trying to understand the oral traditions of a culture. Not learning to use these resources from multiple disciplines could mean losing them and losing sight of the kinds of questions different perspectives such as those represented by working poets and folklorists or communities in the American Indian Library Association could afford. In August 2010, the Council on Library and Information Resources and the Library of Congress issued a report titled *The State of Recorded Sound Preservation in the United States: A National Legacy at Risk in the Digital Age*. This report suggests that if scholars and students do not use sound

archives, our cultural heritage institutions will be less inclined to preserve them. As a result, archives and libraries must collaborate with patrons and scholars to understand how recordings might be used in the future (16). Nancy Davenport, then president of CLIR, surveyed scholars whose work is primarily with audio and concluded that scholars wanted unfettered access and better discovery tools for what she calls "deep listening" or "listening for content, in note, performance, mood, texture, and technology" (41; 157). Finally, the report suggests that training for archivists and librarians in sound preservation must include "critical listening" skills and "relevant experiences in ethnomusicology, oral history, radio or music" (147). If librarians and archivists need to know what scholars and students want to do with sound artifacts in order to make these collections more accessible, then humanities scholars, arguably, also need to know what kinds of analysis are possible in an age of large, freely available collections and advanced computational analysis.

Assuredly, computer scientists and technologists developing systems to allow users better access to oral traditions in folk, poetry, and tribal collections will also benefit from the relevant experiences of scholars and students who already work with these sound artifacts. Charles Bernstein, Donald T. Regan Professor of English and Comparative Literature at the University of Pennsylvania and the Director of PennSound calls literary scholarly inquiry into sound (or critical listening) "close listening;" he closely identifies that activity with increased access, in which case "the sound file would become . . . a text for study, much like the visual document. The acoustic experience of listening to the poem would begin to compete with the visual experience of reading the poem" (*Attack of the Difficult Poems* 114). How we build an infrastructure for analyzing sound has a direct impact on how and what we learn about cultures. In an enclosed support letter for this Institute (Appendix F), Melissa Pond, Director of Library Services at the Leech Lake Tribal College in Minnesota says "the HiPSTAS project has the potential to engender healing and to bolster reclamation of traditional cultures in tribal nations that have been negatively impacted by assimilation policies and by subsequent trauma due to the loss and mainstream devaluing of those traditional cultures." Developing systems based on the "close listening" practices that literary scholars and scholars interested in folk and tribal collections employ alongside the "distant listening" practices that automated discovery, classification and visualization encourage is essential for building critically productive tools that scholars and instructors will want to use.

Computer performance, in terms of speed and storage capacity, has increased to the point where it is now possible to analyze large audio collections with high performance systems. The very popular NEH Digging into Data challenge is a testament to the wide array of perspectives and methodologies high performance digital explorations of sound can encompass. Awarded projects such as the "Mining a Year of Speech" project include an analysis of prosodic elements in audio files in order to align corresponding text with that audio. The "Structural Analysis of Large Amounts of Music" (SALAMI) project has developed audio segmentation tools in NEMA (Networked Environment for Music Analysis) that reveal repetitive structures in music such as "chorus" and "verse" or larger elements like movements in symphony. (Fortunately, because the SALAMI PI, Stephen Downie, and the developers from I3 who helped develop NEMA are involved with HiPSTAS, we have the fortunate opportunity to repurpose the work of SALAMI for this Institute). Other projects, such as the recent Oral History in a Digital Age Project, funded by the Institute of Museum and Library Services (IMLS), also do an excellent job bringing together different groups involved in curating rich media data (including sound), but the project is less focused on what *users* want to do with this data. Finally, none of these projects take on the perspective of scholars and cultural heritage institutions focused on folk, literary, or Native American collections at all.

The HiPSTAS institute has two primary learning outcomes: (1) participants will produce new scholarship using audio collections with advanced technologies such as classification, clustering, and visualizations; and (2) participants will engage in the scholarly work of digital infrastructure development by contributing to recommendations for the implementation of a suite of tools for collecting institutions interested in supporting advanced digital scholarship in sound. Johanna Drucker cautions that "[s]oftware and hardware only put into effect the models structured into their design" and advises that if humanities scholars want digital humanities tools with "the subjective, inflected, and annotated process central to

humanistic inquiry, [humanities scholars] must be committed to designing the digital systems and tools of our future work" (Drucker "Blind Spots"). We are proposing with the HiPSTAS Institute that humanities scholars interested in sound scholarship, stewards of sound collections, and computer scientists and technologists versed in the computational analysis of sound will develop more productive tools for advancing digital sound scholarship if they learn together about current practices, if together they create scholarship, and if they consider the needs, resources, and possibilities inherent in developing a digital infrastructure for the study of sound together.

To this end, the aim of the first four-day meeting ("A-Side"), held at the iSchool at UT in May 2013, would be to introduce participants to essential issues that archivists, librarians, humanities scholars, and computer scientists and technologists face in understanding the nature of digital sound scholarship and the possibilities of building an infrastructure for enabling such scholarship. At this first meeting, participants will develop use cases for a year-long project in which they will use advanced computational analyses such as clustering, classification, and visualization to augment their research on sound. In the interim year, participants will meet virtually with the Institute Co-PI's (Clement, Auvil, and Tcheng) and report periodically in the Institute's online space on their use cases and ongoing research within the developing environment. In the second year, the participants would return to the HiPSTAS Institute for a two-day symposium (the "B-Side" meeting) at the University of Pennsylvania during which they would report on their year of research. In this second event, the participants will first present scholarship based on these new modes of inquiry and critique the tools and approaches they have been trying throughout the development year. This second meeting will end with a day-long session in which the group comes together to draft recommendations for implementing HiPSTAS as an open-source, freely available suite of tools for supporting scholarship on audio files.

The primary objects of study for the HiPSTAS Institute will include spoken text digital audio files that include poetry, speech, and storytelling traditions from a diverse range of perspectives and North American cultures. We have firm commitments from representatives of participating collections willing to make these resources available to I3 for pre-processing. These collections include freely available audio and video files of poetry from PennSound at the University of Pennsylvania, of folklore at the Dolph the Briscoe Center for American History at UT Austin, of speeches at the Lyndon B. Johnson Library and Presidential Museum (LBJ Library) in Austin, and of storytelling traditions at the Native American Projects (NAP) at the American Philosophical Society (please see Appendix A for descriptions of holdings and Appendix E for commitment letters) in Philadelphia. The HiPSTAS Institute will focus on collections of these audio files for three primary reasons. First, much work has been done on using advanced computational technologies to analyze music and oral traditions, but we believe that scholars and students who are interested in analyzing folk, indigenous, and poetry collections are underrepresented in these conversations. Second, as part of the SALAMI project, the I3 staff at Illinois has already developed tools for analyzing music (NEMA) as well as for analyzing bird calls (ARLO) that focus on prosodic elements similar to those that scholars interested in analyzing oral traditions in poetry, folklore, and ethnographic studies already employ. We will adapt these tools for use in the HiPSTAS Institute. Third, the participating collections make archival quality resources with robust metadata freely available, but currently offer little or no means to support scholars seeking to use advanced computational tools for analysis on these resources. As a result of this Institute, scholars and instructors will understand better how to "imagine what they don't know"—how to analyze sound files with advanced computational analysis. Further, participating collections will have increased the visibility of their holdings and will serve as models for other cultural heritage institutions that seek to make their folk, indigenous, and poetry collections available to high performance sound analysis. It is this point in history, when we have created a large number of high quality and significant digital sound files and are developing ever more efficient means for computational analysis, that gives rise to our proposal for the HIPSTAS Institute.

Institutional Profiles

The iSchool at the University of Texas at Austin has a long history of demonstrated preparedness in undertaking new initiatives and forging new experimental models to meet the needs of a diverse range

of cultural heritage institutions within a rapidly changing technological scene. In July 20–21, 2006, the iSchool hosted *Sound Savings: Preserving Audio Collections*, a meeting sponsored by the Library of Congress National Recording Preservation Board and the Association of Research Libraries for the purpose of identifying the major elements and core knowledge to be taught in a master's degree or an advanced certificate program on sound preservation. This meeting arose because of work iSchool faculty such as Sarah Cunningham and students have been doing since 1997 to provide new kinds of digital access to the recorded holdings of the UT Libraries, the Harry Ransom Center (HRC), the Briscoe Center for American History, and the LBJ Library. The iSchool has been involved with the development of rich-media software since 1999, working to combine audio, video, synchronized transcripts, documents, images, and maps into searchable rich-media, and using these materials in coursework and other projects. Collections digitized and processed by classes include: The Mike Wallace Interview, held by the HRC, The Texas Legacy Collection; The Oral History of the Texas Oil Industry collection, held by the Briscoe Center; The Interactive Daily Diary of President Lyndon B. Johnson, held by the LBJ Library. These collections represent hundreds of hours of searchable audio and video content curated by students at the iSchool in collaboration with the holding institutions. Current advanced computational projects include "Transcribe LBJ," a crowdsourced audio transcript correction and transcription project to create a searchable collection of the 800 hours of recorded telephone conversations from the LBJ White House, as well as ongoing work on the hundreds of hours of the Oral History of the Texas Oil Industry. Featured on the Briscoe Center's rich media portal, these audio and moving image materials and tools created by iSchool faculty and students allow researchers to navigate the hours of content in new ways.

The iSchool will be the primary host for the first ("A-Side") meeting of the HiPSTAS Institute. As the capital of Texas, Austin is known for "keeping it weird" (an unofficial slogan coined by an iSchool instructor and her husband), for live music and for great food and art. UT Austin is ranked 47th nationally among all major research universities and 15th nationally among public research universities in the 2010 edition of America's Best Colleges. In 2009, US News and World Report ranked the iSchool #8 in the nation and #1 nationally in archives and preservation. The first day of the Institute will be held at the Harry Ransom Center and the third afternoon will be held at the Visualization Lab at TACC (Texas Advanced Computing Center). An abundance of nearby on-campus housing, local hotels, and restaurants makes the iSchool's central location especially convenient for the first meeting of the Institute. The second ("B-Side") meeting in 2014 will be held either at the iSchool or the University of Pennsylvania Kelly Writer's House, depending on the geographical and resource needs of participants.

The Illinois Informatics Institute (I3) at the University of Illinois-Urbana Champaign will be supporting the advanced computational technologies that underpin the HiPSTAS Institute. The staff of I3 has years of experience in high-performance audio analysis of music and bird calls and is well poised to facilitate applying these methods in a new context. Analysis of the spoken word is related to the work that scholars have done for decades on features of music and bird song that include pitch, tempo, and accent. Stephen Downie and Michael Welge developed a system for comparing different music retrieval systems (MIR) for which they received funding from the National Science Foundation.

The I3 group also collaborated on NEMA (Networked Environment for Music Analysis), which brings together the collective projects and the associated tools of world leaders in the domains of music information retrieval, computational musicology, and digital humanities research. NEMA is an open and extensible webservice-based resource framework that the digital humanities community can use for discovery and classification analysis of prosodic features. Examples of how NEMA can be used for music analysis helps in understanding how it will be used in the HiPSTAS Institute for analyzing spoken word audio. The NEMA system, for instance, can be used for genre and mood classification as well as composer identification (corresponding to identifying genre, mood, and author in spoken word audio); for similarity retrieval where similarity is measured on prosodic features of pitch, tempo, and accent or the key or tone of music; and structural segmentation evaluation that identifies the key structural sections in music such as a change in verse, movement, or the addition of a chorus (which can correspond with segmenting stanzas in a poem or sections of spoken audio that contains a story). The NEMA architecture provides a firm base for the technological infrastructure of the HiPSTAS Institute. In addition to NEMA,

the Institute will integrate elements of ARLO (Adaptive Recognition with Layered Optimization). ARLO was developed for classifying bird calls and using visualizations to help scholars classify pollen grains. ARLO has the ability to extract basic prosodic features such as pitch, rhythm and timbre for discovery (clustering) and automated classification (prediction or supervised learning) as well as visualizations. The current implementation of ARLO for modeling runs in parallel on systems at the National Center for Supercomputing Applications (NCSA). The source code for ARLO is open-source and will be made available for research purposes for this and subsequent projects.

Curriculum and Work Plan

The HiPSTAS Institute will be held over two meetings (A-Side and B-Side) that will be held approximately twelve months apart. The A-side meeting will take place over the course of four days in Austin, TX at the Harry Ransom Center and UT's iSchool. In the interim year, status reports, FAQs, and technical updates will be posted in a wiki space in Google Sites. Recommendations generated after the Institute will be made available on an online space (maintained by UT's iSchool), and scholarship that results from this work will be considered for a special, peer-reviewed issue of *Jacket2* magazine (http://jacket2.org/), which is affiliated with PennSound.

Pre-meeting October 2012- May *2013:* On November 1, 2012, a call-for-proposals (due January 1, 2013) will be issued. After deliberations by the HiPSTAS board, participants will be selected by February 1st. In their applications, participants will designate the specific audio collections they are interested in analyzing (more on the application below in "Participants") and the participating collections will make these files available to I3 for pre-processing and storage through the life of the project. Pre-processing analytics will include spectra computation, prosody feature extraction, and clustering.

A-Side meeting, May 2013: The first meeting of the HiPSTAS Institute will be held over four days at the iSchool at UT Austin and will focus on creating use cases for development for the interim year. The first day and the afternoons of the second and third day will include presentations and conversations by and with invited speakers and project participants. The invited speakers (described below in "Participants") will include archivists and librarians who are responsible for cultural heritage sound artifacts from the partnering cultural heritage institutions as well as scholars who focus on audio files in their research, and computer scientists and technology developers experienced with advanced computational analysis of sound and sound visualization. Participants selected from the call for proposals will also present their research, areas of interest, and proposed use cases. The objective of these initial conversations is to introduce each community (librarians and archivists, humanities scholars and computer scientists and technologists) to the particular questions and concerns of the other.

The mornings of the second, third, and fourth days will be held in a computer lab space at the iSchool. These labs will begin with an overview of the tools NEMA and ARLO, which the participants will use and will help develop over the course of the year. These labs will include an introduction to audio search, clustering, segmentation, and visualization. Over the course of the three labs, participants will learn to use NEMA and ARLO on their pre-selected audio collections and to understand the data that was pre-processed by I3. Discovery analytics in audio include extracting a set of features (such as pitch, tempo, and accent) from the audio files and then these features can be clustered to reveal patterns. For example, clustering processes group similar speech sounds. These clusters could indicate when a narrator assumes different character voices in the case of storytelling or poetry or when she uses different languages in the case of the Ojibwe recordings. During each lab, participants will discuss prosody features of interest to their research. Tcheng and the participants will discuss different approaches to include on a "wishlist" for development in NEMA and ARLO over the course of the interim year. In the afternoon of day two, participants will move to the TACC Visualization Lab and will be introduced to a variety of visualizations generated by the TACC team that could be made accessible as part of the HiPSTAS system including ProseVis, a Mellon-funded prosody visualization tool PI Tanya Clement is already developing with teams from I3 and TACC. In the afternoon of day three, participants will be introduced to the advantages and pitfalls of developing technical infrastructures with dispersed use cases. This time will include setting the groundwork for the online space in which the Institute will meet over

the course of the year, re-articulating individual project goals and needed resources, and creating a project plan with proposed deadlines. The fourth and final day of the A-side meeting will conclude with closing remarks over a working lunch.

In the interim year, conversation and collaboration will take place in project work spaces we will create in free, open-source platforms on Google. Clement, Tcheng, and Auvil will be available for monthly virtual meetings and for an entire group meeting in mid-January 2014 in Google Hangout. These meetings will convene to discuss updates to the systems, specific use-case developments, and to guide participants with any new data sets that become available as participants require new features. We will use Google Sites for a wiki space for the participants to share monthly status reports; for a discussion board for questions; and for an ongoing master document in which Clement will synthesize the status reports. These documents will lay the groundwork for the final white paper and set of recommendations.

B-Side meeting, May 2014: The second-year meeting will be held over two days either at UT Austin or at the University of Pennsylvania, hosted by PennSound and the Kelly Writer's House. On the first day, participants will present their scholarship in a symposium that is open to the public. There will be approximately four panels with three speakers on each panel and a responder (one of the invited speakers from the first meeting), resulting in a full day of panels with three hours in the morning and three hours in the afternoon divided by breaks and conversation. On the second morning, project participants will meet to provide feedback on the technical infrastructure developed over the course of the year. What aspect of the process was most frustrating? What ongoing support is needed to make these kinds of environments useful to scholars in the future? What can cultural institutions do to support these new research activities? How do we make this research available for peer-review and teaching? What are future grant opportunities the group might engage to support this work? In the afternoon of the second day, the group will divide into small working groups to compile two sets of draft recommendations based on this conversation and the year's work, including (1) recommendations for implementing an open-source, freely available suite of tools for supporting scholarship on audio files; (2) and best practices for cultural heritage institutes invested in making their data accessible for this kind of implementation.

Participants: The HiPSTAS Institute will be open to 20 junior and senior faculty and advanced graduate students as well as librarians and archivists who will submit an application package that will then be reviewed and ranked by the HiPSTAS board. Evidence of the capacity for successful collaboration and for scholarly innovation is required, but applicants *do not need experience with high performance or advanced computational analysis* to be considered. They must demonstrate a strong research interest in working with spoken text audio collections and must clearly articulate their research interests in the collections participating in the HiPSTAS Institute. (Participating collections will be described in detail on the UT website.) Alternatively, a participant must include documentation proving that another digital sound collection of interest, possibly at their home institution, will be made accessible to them and the I3 group throughout the Institute for processing. We will attract a diverse range of participants by advertising the Institute on the UT site and at each of the collecting institutions. We will disseminate the call through prominent digital humanities networks such as *Humanist* and Twitter. We will also advertise through the National Poetry Foundation (through Steve Evans), the Society of Southwest Archivists (through iSchool Professor Pat Galloway), which will be convening in Austin just after the first Institute, May 29-31, 2013. As well, with board member Loriene Roy's guidance, we will advertise the Institute through a variety of groups associated with the American Indian Library Association (AILA), the Association of Tribal Libraries, Archives and Museums (ATALM) and the International Federation of Library Associations and Institutions (IFLA) SIG on Indigenous Matters. Melissa Pond, Director of Library Services at Leech Lake Tribal College and a collaborator with the APS Native American Projects and Sandy Littletree of the AILA have both written letters of support and have committed to advertising the Institute to their respective communities.

Because we want to encourage scholars and instructors as well as stewards of sound collections to apply to the HiPSTAS institute, we will accept two primary types of proposals. Participants who wish to focus primarily on generating scholarship with new methodologies must include a 4-page description of a

possible research question including a clear description of the participating audio collection to be used and specific files of interest within those collections. Successful proposals will address questions of audience and identify the hermeneutic framework or disciplinary background in which the research question is posed. Proposals should include the participant's experience with "close listening" methodologies and attempt to articulate a "distant listening" question that considers possible patterns of interest across audio files in one or more collections. The proposal should clearly state the project's argument and its possible contribution to sound scholarship.

Participants who wish to focus primarily on the sound preservation and access issues that stem from new scholarly methodologies might consider a second type of proposal. In these proposals, participants might identify a collection outside of the participating collections with which they will work over the course of the HiPSTAS Institute such as one from their home institution. These proposals must include a clear description of the collection and must include a letter of support that indicates that the collection will be made accessible to the participant and the HiPSTAS Institute for processing. The proposal must also include a possible research question including a clear description of the audio collection to be used. It should identify from which disciplinary fields the collection might garner the most interest and why the research question might be of interest to that audience. Proposals should include the participant's experience with sound preservation methodologies, attempt to articulate the ways in which access to the collection would be enhanced by infrastructure that supports "distant listening" scholarship, and identify the ways in which this collection is currently made accessible to the public.

Other required materials from all participants will include two letters of recommendation, a brief biography and full C.V., and a list of audio recordings for pre-processing by I3. Projects that articulate a clear understanding of the value of "distant listening" and that address the questions noted above will be given a higher evaluation by the board.

Because our hope is that participants will enter the HiPSTAS Institute with a variety of skill and experience levels in sound preservation and analysis, the curriculum is highly flexible and adaptable. Professional researchers with greater experience in sound analysis will have introductory exposure to the work of sound preservation and data management at collecting institutions. Those who are not full time researchers will have exposure to a showcase of research questions that will augment their ability to imagine productive research questions. The UT faculty and the I3 team have worked with professionals and students at a variety of skill levels. The readings for the Institute have been chosen to allow all participants, regardless of skill level, access to a general knowledge of key questions in building infrastructure in the digital humanities, in conducting sound analysis, and in sound preservation issues.

Impact and Evaluation: We anticipate several important results from the HiPSTAS Institute. The curriculum of this Institute is premised on the idea that building scholarly infrastructure in the digital humanities is the work of scholars, librarians and archivists, and computer scientists together. Based on the readings we are planning for the Institute and the nature of the work we are engaging, we anticipate that the resulting scholarship will reflect deep collaborations and a knowledge of digital sound preservation and computational analysis of sound; that the participating collections will have increased their ability to allow users to perform new kinds of scholarship with the data sets created by I3; and that the recommendations we create for the development of advanced computational tools for digital scholarly inquiry in sound will reflect the needs and concerns of both the stewards of sound collections and the scholars who use them. We see three primary outcomes of the HiPSTAS Institute, closely tied to evaluation, as having the most impact on advancing computational analysis in sound scholarship:

1. *Publicly available ongoing evaluation on the process of scholarship and technical developments:* A website at the iSchool will be maintained as a public source for information about the project and a venue for disseminating final reports. Much of the dialog before the first Institute, in the interim year, and after the close of the Institute will take place in project work spaces we will create in free, open-source platforms on Google. Beyond the monthly virtual meetings and the big mid-January 2014 meeting in Google Hangout, we will use Google Sites for an ongoing master document in which Clement will synthesize the reports from the participants

engaging research, the concerns laid out by archivists and librarians, and the ongoing development of ARLO and the customization of NEMA. These documents will lay the groundwork for our final white paper and set of recommendations.

2. *Curriculum and Scholarship:* The curriculum, including the NEMA and ARLO labs, and the outcome of both meetings of the HiPSTAS Institute will be made openly available as part of the white paper on the planned iSchool web site. Subsequent to the final meeting, participants will be invited to contribute scholarship to a special issue of *Jacket2* magazine, a preeminent and open source venue for creative and scholarly, digital work. The visibility of the curricular materials, and of participants' samples and documentation via the web site, will also make the results of this Institute accessible to a wider audience beyond those able to participate directly.

3. *Final white paper and recommendations*: The final white paper, written by Clement, Tcheng and Auvil, will reflect on the monthly status reports and the developing infrastructure in NEMA and ARLO within the context of digital humanities infrastructure. Based on this work and the recommendations drafted by the participants on the final day of the Institute, this report will include recommendations for implementing an open-source, freely available suite of tools for supporting scholarship on audio files; including best practices for interested cultural heritage institutes who wish to make their files available for data processing in the HiPSTAS system. The purpose of disseminating these recommendations through the UT iSchool would be to offer best practices for cultural heritage institutes that are new to making their sound files available via Web services frameworks and to provide the final recommendations for developing and implementing a more robust technical infrastructure based on feedback about NEMA and ARLO collected during the HiPSTAS Institute.

Participants in the Institute will be asked to evaluate the Institute on several occasions. In the application, participants will be asked to briefly describe their goals for the Institute. At the end of each lab, participants will be asked to evaluate both the theoretical and practical instruction, as well as the structure of the labs. After the mid-year virtual meeting, participants will be asked to evaluate their experiences with the virtual meetings and status report system, and to evaluate the impact of the Institute thus far on their own research. Finally, during the symposium in 2014, participants will be asked to provide a final evaluation of the Institute. Presentations at this symposium and the final *Jacket2* special issue will also help us gauge the impact of the institute on participants' research.

Staff, Faculty, and Consultants

Advisory Board:
Loretta Auvil, Sarah Cunningham, Dr. Tanya Clement, Dr. Steve Evans, Dr. Loriene Roy

Dr. Tanya Clement [PI] is an Assistant Professor at the iSchool at UT. She has worked with I3 staff on grants to develop machine learning analysis and visualizations for humanities scholarship, including ProseVis, a visualization tool for analyzing prosody in text. She has written extensively on this work. She will be the primary organizer and convener of each event and the board; she will consult and liaison with the participating collections and the participants during the interim year; and she will be primarily responsible for the online space, the final white paper, and the final recommendations.

Loretta Auvil, MS [Co-PI] Senior Project Coordinator, I3. She has worked with a diverse set of applications to integrate machine learning and visualization techniques to solve the needs of research partners and led software development and research projects for many years. Auvil will manage the UIUC portion of the project, coordinating the labs, directing the work of the I3 team, coordinating interim-year consultations and writing the final white paper and recommendations.

David Tcheng [Co-PI] Research Programmer, I3. Tcheng will direct pre-processing on the audio files for use in ARLO, including setting up ARLO for applying classification and clustering techniques. He will develop and run the labs for Side-A, implement interim-year development in ARLO, and help write the final white paper and recommendations.

Boris Capitanu, Research Programmer, I3. Capitanu will help coordinate the labs including customizing the NEMA tools for the spoken word audio collections. He will help with any new features that are identified during the first workshop for further NEMA development.

Principal faculty and lecturers:
Sarah Cunningham is a lecturer at the iSchool where she teaches introductory and advanced classes in audio preservation and reformatting. Cunningham is also the Audiovisual Archivist at the Lyndon B. Johnson Library, a division of the National Archives. As an advocate for the field, Sarah serves on the Oral History in the Digital Age board and has helped research the field for the National Recordings Preservation Board's project *The State of Recorded Sound Preservation in the United States*. She will discuss these projects and the LBJ sound collections.

Dr. Stephen Downie is a Professor and Associate Dean of Research at the Graduate School of Library and Information Science at the University of Illinois at Urbana-Champaign. Downie will discuss Music Information Retrieval generally, the SALAMI Project, and the development of NEMA.

Brenda S. Gunn is the Associate Director and Janey Slaughter Briscoe Archivist, Briscoe Center of American History, at the University of Texas at Austin. Ms. Gunn leads the archives, library, public service, digital projects, and preservation activities of the Briscoe Center as well as major projects funded from federal, state, and private grants. She will discuss digital project development and the Briscoe sound collections.

Dr. Steve Evans is an Associate Professor of English at the University of Maine and the Acting Director of the National Poetry Foundation. He is the creator and primary editor of the web site "Poetry is the Lipstick of Noise." The site comments on and contributes to PennSound and other sources of digital audio files of poetry. He will discuss his extensive teachings and writings on phonotextuality as well as his own research on sound files in the PennSound collection.

Dr. Al Filreis is the Kelly Professor of English at the University of Pennsylvania, the Director of PennSound, and publisher of *Jacket2*. He will discuss the creation and management of PennSound as well as his (and many others') scholarship with sound files.

Dr. Timothy Powell is a faculty member in the Religious Studies Department at the University of Pennsylvania and the Director of Native American Projects at the American Philosophical Society. He has directed three NEH grants in partnership with Ojibwe tribal and community colleges in northern Minnesota. He will discuss these audio collections and his work with scholarly and tribal communities.

Rob Turknett is the Media, Arts and Humanities Coordinator for the Texas Advanced Computing Center (TACC). He is also a founder and current board president of the Austin Museum of Digital Art. He has received an NEH grant for developing a general purpose interface for large scale displays that uses the computer language Processing in order to visualize large amounts of humanities materials. He will work with Clement to develop and teach the visualizations session including introducing the ProseVis tool.

Dr. Loriene Roy is a Professor in the iSchool. She is Anishinabe, enrolled on the White Earth Reservation, and a member of the Minnesota Chippewa Tribe. She was elected as the 2007-2008 President of the American Library Association and the 1997-1998 President of the American Indian

Library Association. She will discuss how these organizations have approached TCE (traditional cultural expressions) and the impact these conversations have on incorporating sound recordings from tribal communities into HiPSTAS. She will work to include tribal communities in this Institute.

Statement of Work
Institute for High Performance Sound Technologies for Analysis and Scholarship (HiPSTAS)
October 1, 2012 – August 31, 2014
Lead Institution: University of Texas Austin (NEH, PI Tanya Clement)

Overview
The School of Information (iSchool) at the University of Texas at Austin (UT) and the Illinois Informatics Institute (I3) at the University of Illinois at Urbana-Champaign (UIUC) propose to host two rounds of an NEH Institute on High Performance Sound Technologies for Analysis and Scholarship (HiPSTAS). If funded, the Institute will include 20 humanities junior and senior faculty and advanced graduate students as well as librarians and archivists from across the U.S. interested in research in the spoken word within poetry, ethnographic, and folklore audio collections. Participants will learn about the state of digital sound preservation and sound studies, will work to advance scholarship based on advanced computational methodologies and will contribute to a set of recommendations for the development of tools for digital scholarly inquiry in sound. The HiPSTAS institute has two primary learning outcomes: (1) participants will create new scholarship using audio collections with advanced technologies; and (2) participants will engage in the scholarly work of digital infrastructure development by contributing to recommendations for the implementation of a suite of tools for advanced digital scholarship in sound.

We are proposing with the HiPSTAS Institute that humanities scholars interested in sound scholarship, stewards of sound collections, and computer scientists versed in computational analytics and visualizations of sound will develop more productive tools for advancing digital sound scholarship if they learn together about current practices, if they create scholarship together, and if they consider the needs, resources, and possibilities inherent in developing a digital infrastructure for the study of sound.

The aim of the first four-day meeting ("A-Side"), held at the iSchool at UT in May 2013, is to introduce participants to essential issues that archivists, librarians, humanities scholars, and computer scientists face in understanding the nature of digital sound scholarship and the possibilities of building an infrastructure for enabling such scholarship. At this first meeting, participants will develop use cases for a year-long project in which they use advanced technologies such as clustering, classification, and visualization to augment their research on sound. In the interim year, participants will meet virtually with the Institute Co-PI's (Clement, Auvil, and Tcheng) and report periodically on their use cases and ongoing research within the developing environment. In the second year, the participants will return to the HiPSTAS institute for a two-day symposium (the "B-Side" meeting) at the University of Pennsylvania during which they would report on their year of research. In this second event, the participants will first present scholarship based on these new modes of inquiry and critique the tools and approaches they have been trying throughout the development year. This second meeting will end with a day-long session in which the group comes together to draft recommendations for implementing HiPSTAS as an open-source, freely available suite of tools for supporting scholarship on audio files.

The Role of Illinois Informatics Institute

I3 will help to manage the institutes and participate in the selection of the participants from the pool of applicants. I3 staff will set up and present demonstrations at the first institute (May 2013), and in preparation for the first institute, I3 staff will process audio collections to be used in ARLO, which will provide spectral visualization, classification and clustering of the audio. Staff will also customize the NEMA tool so that it can be used for the spoken word audio collections. I3 staff will attend the first workshop and run 3 lab sessions using the ARLO and NEMA tools. After the first workshop, during the interim year, I3 will work to implement and reprocess the data as need for the tasks identified during the workshop. We will also participate in the second workshop (May 2014).

Appendix A: Collections

American Philosophical Society Native American Projects: Three NEH grants have supported Tim Powell's work at the **American Philosophical Society Native American Projects** with the Ojibwe Indian bands in northern Minnesota to produce more than 70 hours of video and audio tape recordings of Ojibwe elders discussing traditional knowledge. The current NEH grant (2010-2011) through the Leech Lake Tribal College funds work to build a digital archive at the college with a mirror site at the University of Pennsylvania. The raw footage has been edited into more than eighty 3-5 minute videos, all of which are freely available on YouTube. The grant is paying for the current prototype of an Ojibwe digital archive, entitled Gibagadinamaagoom ('To Bring to Life, to Sanction, to Give Permission, http://www.gibagadinamaagoom.info/), to be redesigned in a Drupal CMS by the Penn's School of Arts and Science Computing, which will maintain the site. Dr. Powell also serves as Director of Native American Projects at the American Philosophical Society, where he currently directs an Andrew W. Mellon Foundation grant to digitize the entire Native American audio recordings collection, which totals more than 3000 hours. The APS is working, on the same grant, with the Ojibwe, Tuscarora, Penobscot and Eastern Band of the Cherokee Indians to create digital archives in each of these communities of materials digitized from the APS collections. A Native American advisory board is creating protocols to protect culturally sensitive recordings, making these APS collections unavailable for public consumption on the web. However, Powell and participants at the Institute will be able to access the processed files for analysis.

The Dolph Briscoe Center for American History: As a leading history research center, **The Dolph Briscoe Center for American History** collects, preserves, and makes available documentary and material culture evidence encompassing key themes in Texas and U.S. History. With the assistance of staff and students in the School of Information, digitization of the Briscoe Center's audio and moving image archives are now on the Briscoe Center's website. Featured on the Briscoe Center's rich media portal, The Texas Oral History of the Oil Industry includes audio and moving image materials that are enriched with access tools such as searchable transcripts, indexes, table of contents, and geographical data. These tools, now synchronized to the audio/visual content, allow researchers to navigate the hours of content in creative ways.

Another important sound archive within the Briscoe Center's holdings is the University of Texas' Folklore Center Archives, which includes manuscript, typescript, printed, photographic, and audio material. Spanning six decades of work, the Folklore Center Archive produced 1686, 1/4" tapes and 357 cassettes along with cataloging records for most of these recordings. Riddles, proverbs, games, jokes, legends, folktales, and instrumental music are just a few types of content that were recorded in the field by folklorists John A. Lomax, William A. Owens, John Henry Faulk, Americo Paredes, and Mody Boatright. Much of the folklore collected came from Texas, the Southwest and Latin America.

Lyndon B. Johnson Library: The Lyndon B. Johnson Library holds many audio collections pertaining to President "LBJ" and his wife "Lady Bird" Johnson. The speeches by LBJ, Lady Bird, the cabinets members and the newer ones from events that the LBJ Library host are open access and in the public domain. Pre-Presidential, 1936-1963 collections include mostly 1960 campaign speeches, transferred from dictabelts recorded by Senator Johnson's staff; also official remarks delivered by Lyndon B. Johnson while representing the United States abroad during his vice presidency, recorded by USIA (378 tapes). Presidential, 1963-1969, collections include audio recorded by the White House Communications Agency (848 tapes). Post-Presidential, 1969-1973, and Mrs. Johnson, 1969- collections, recorded by the LBJ Library or received in donation comprise 227 tapes. That way you can use the files and will not have to purchase copies. Selected Speeches and Remarks by Mrs. Lyndon B. Johnson, 1964-1969, collections were recorded by the White House Communications Agency (156 tapes).

PennSound: (http://writing.upenn.edu/pennsound/) was launched January 1, 2005, as a Web-based archive for noncommercial distribution of the largest collection of poetry sound files on the Internet. PennSound offers a large variety of freely accessible digital recordings of poems -- currently 27,394 downloadable MP3s and fast growing -- mostly as song-length singles. It would take a person 5,120 hours (213 days) to listen to all the files currently in PennSound. PennSound combines aspects of a library archive and a Web music-download site. Basic bibliographic information is incorporated in each file so that a user downloads not only the sound but also key facts about the recording, including author, title, place and date of the recording, series, as well as copyright information. As part of the PennSound project, the Annenberg Rare Books and Manuscripts Library at Penn is developing a sophisticated cataloguing tool for the poetry sound files, enabling other libraries to collect the material and enabling teachers to add the MP3s to their online syllabi. The poetry sound files are retrievable both from a library catalog by authors' names and via Web search engines. Charles Bernstein, Co-Director with Al Filreis, writes, “The beauty of PennSound is that in the course of preserving these recordings, we are also making available a treasure trove of wonderful poetry performances that we believe will attract a whole new generation to poetry as a performance art.” PennSound is an ongoing project for producing and archiving new audio recordings from Penn and around the world, as well as preserving existing audio archives. The site provides as much documentation about individual recordings as possible with new files and new bibliographic information to be added. PennSound works closely with the Electronic Poetry Center (http://epc.buffalo.edu) and UbuWeb (http://ubu.com) as well as Penn's English Department and School of Arts and Sciences Computing.

Appendix B: Course Outline

A-Side Meeting, May 2013, University of Texas at Austin
Day 1

Time	
8:30 am - 9:00 am	Continental Breakfast [*Harry Ransom Center, Tom Lea Room*]
9:00 am - 10:00 am	**Introductions, Overview of the HiPSTAS Institute** [*Tanya Clement* and *Loretta Auvil*]
10:00 am- 11:00 am	**The State of Sound and Cultural Preservation** [*Sharon Cunningham*, *Dr. Loriene Roy, Mukurtu representative*] Cunningham will introduce the field of sound preservation, including essential past and perceived future issues, and will discuss updates in the field since the publication of the National Recordings Preservation Board's project *The State of Recorded Sound Preservation in the United Sate: A National Legacy at Risk in the Digital Age* (August 2010). She will introduce how sound preservation is taught at the UT iSchool as a result of this publication using LBJ Recordings as an example of collaborations in sound between scholars, sound archivists, and students. She will discuss her current work with the IMLS Oral History in the Digital Age Board and her chapter on Audio preservation for Oral Historians. Dr. Roy will discuss recent work in cultural heritage initiatives and professional LIS (Library and Information Science) organizations concerning TCE (traditional cultural expressions) and the impact these conversations have on incorporating sound recordings from tribal communities into HiPSTAS. These organizations include American Indian Library Association (AILA), the Association of Tribal Libraries, Archives and Museums (ATALM), and the Tribal College Librarians Professional Development Institute among others. Roy will discuss the potential of negotiating access through the promise of *Mukurtu*, and contributions to Native language revitalization. A *Mukurtu* representative will be available by Skype to introduce participants to the *Mukurtu* system. Mukurtu (http://www.mukurtu.org/) is a free and open source community content management system that provides international standards-based tools adaptable to the local cultural protocols and intellectual property systems of Indigenous communities, libraries, archives, and museums. Is a flexible archival tool that allows users to protect, preserve and share digital cultural heritage, and the representative will discuss a range of possible ways in which a HiPSTAS system could be developed to work with the Mukurtu system.
11:00 am – 12:00 pm	**The SALAMI Project and the State of Structural Analysis of Music** [*Dr. Stephen Downie and David Tcheng*] Downie and Tcheng will discuss the current state of structural analysis of music (formal analysis), which is one of the most fundamental analyses performed by music researchers, who seek to understand the overall view of a piece. Any course of formal analysis is often a core course in undergraduate music curricula. Formal analysis is useful in classifying different genres of music and it can be used to compare different

	styles of composition within a composer's works or between composers. It can also be used to understand historical influences over time and location. Downie will discuss the SALAMI Project (including the development of NEMA), the goal of which is to develop new text mining methods that are consistent with the manual processes that experts currently used to analyze music. Downie will discuss key outcomes from this study, including a longitudinal study of manual discovery and synthesis behaviors of a diverse network of faculty, policy makers, and students, advances in natural language processing methods that automatically identify concepts and relationships, detect entailment and paraphrasing, and generate multi-document summaries, a collection of gold standards that reflect diverse and realistic information needs that will drive further research in natural language processing. Tcheng will introduce ARLO. Downie and Tcheng will show examples of the analysis of large sets of music and new discoveries made with these questions.
12:00 pm- 1:00 pm	Box Lunches
1:00 pm - 2:00 pm	**Introduction to HiPSTAS Participating Collections and Scholarly Perspectives on Sound Studies** [*Sarah Cunningham, Dr. Al Filreis, Brenda Gunn, Dr. Timothy Powell*] Representatives from each of the participating collections will introduce these collections. Ms. Cunningham will introduce the speeches available at the LBJ Library. Dr. Filreis will discuss the poetry collections at PennSound. Ms. Gunn will introduce the folklore collections at the Briscoe Center and Dr. Powell will introduce the storytelling audio collections of the Native American Projects at the American Philosophical Society.
2:00 pm - 3:00 pm	**Introduction to Scholarly and Cultural Perspectives on Sound Studies** [*Dr. Steve Evans* and *Dr. Timothy Powell*] Evans will trace the emergence of the "phonotextuality" as an area of inquiry and analysis within the field of literary hermeneutics. He will discuss his own work on poetry audio files, which dates back to archival experiences with analog formats (mostly reel-to-reel and cassette) in the 1980s, and talk about the increased interest in recorded poetry among scholars (and poets) in the era of freely-accessible large-scale digital file serving platforms such as PennSound, Ubuweb, the Naropa Poetics Audio Archive, and many others. He will introduce the work of other scholars and poets interested in sound studies. Finally, he will address some of the challenges, and opportunities, involved in the attempt to adapt advanced computational tools to the purposes of humanistic inquiry in the field of poetry and poetics. Dr. Powell will discuss the particular interests that Ojibwe people or scholars may have in analyzing sound files within "Gibagadinamaagoom: An Ojibwe Digital Archive" including examples of the shift from English to *Ojibwemowin* ('the Ojibwe language') at culturally significant moments. This shift is the work of the Ojibwe *oshkabewis* ("one empowered to translate between the spiritual and mundane worlds") and is of great interest both to elders who seek to educate youth in the ways of the language and for scholars and sound preservationists interested in analyzing the

	collections. In addition, Powell will discuss possible analysis that scholars interested in Native American Projects may have in doing analysis across collections of different tribes.
3:00 pm - 4:00 pm	Introduction to Participant Projects: Lightening Rounds
4:00 pm - 5:00pm	Optional Outing to tour Briscoe Center of American History and UT iSchool Sound Digitization Lab [*Brenda Gunn*]

Day 2

8:30am - 9:00 am	Continental Breakfast [*UT iSchool Lab*]
9:00 am - 12:00 pm	**Lab: Using High Performance Sound Technologies, Introduction to Visualization and Discovery Processes in ARLO** [*David Tcheng*] Tcheng will demonstrate the machine learning discovery process (unsupervised learning) showing how audio can be segmented, clustered, and visualized revealing hidden patterns in the recordings. All machine learning experiments will be completed using ARLO (Adaptive Recognition with Layered Optimization), an advanced machine learning system based on principles developed by Tcheng. ARLO uses multiple objective bias optimization to find optimized combinations of example representation (e.g. features) and learning strategy (e.g., neural nets, decision trees, instance based). ARLO has been applied to species identification problems using sight, sound, and motion. In particular, I3 will extract fundamental pitch trace features and tempo features from the participants spoken word audio collections.
12:00 pm - 1:00 pm	Box Lunches
1:00 pm – 4:00 pm	**ProseVis Demonstration and Visualizations Lab at TACC (Texas Advanced Computing Center)** [*Tanya Clement and Rob Turknett*] Participants will be introduced to audio spectrogram visualizations of their audio files. Participants will see how different prosody features can be extracted from the spectrograms. Participants will also be introduced to ProseVis, a visualization tool Clement developed in collaboration with the Auvil and Tcheng as part of a use case supported by the Andrew W. Mellon Foundation. Features of sound in text used in this tool include parts-of-speech, accent, phoneme, stress, tone, break index. This tool facilitates a reader's ability to analyze and disseminate the results in human readable form. Research has shown that mapping the data to the text in its original form allows for the kind of human reading that literary scholars engage: words in the context of phrases, sentences, lines, stanzas, and paragraphs. Turknett will introduce the participants to the most recent visualization applications being developed at TACC as well as other open source freely available tools to use with

	sound including Audacity (http://audacity.sourceforge.net/), SonicVisualizer (http://www.sonicvisualiser.org/), and WaveSurfer (http://www.speech.kth.se/wavesurfer/) among others.
4:00 pm - 5:00 pm	Optional tour of the Harry Ransom Center

Day 3

8:30am-9:00 am	Continental Breakfast
9:00 am-12:00 pm	**Lab: Using High Performance Sound Technologies, Introduction to Classification in ARLO** [*David Tcheng*] Tcheng will demonstrate similarity based search and the machine learning classification process. We begin by showing how ground truth examples are generated with ARLO through the tagging process. Participants will identify (tag) a single segment of interest in their audio collection using ARLO's spectrogram visualizations as their guide. Given a single tagged example, participants will search their audio collections with ARLO finding most similar matches. Next we progress to predictive modeling (classification, supervised learning). Participants will be allowed to "tag" more examples in their collections creating multiple examples of each category of interest. The result of this tagging process will be a catalog of examples of each category. These examples will be transformed into a classification model using ARLO's predictive modeling capabilities. Finally, the classification model will be used to classify larger portions of entire collections to discover new patterns of interest.
12:00 pm-1:00 pm	Box Lunches
1:00 pm-2:00 pm	**Developing Infrastructure with Use Cases in DH** [*Tanya Clement and Loretta Auvil*] Clement and Auvil will introduce participants to the advantages and pitfalls of developing technical infrastructures with dispersed use cases. This time will include setting the groundwork for the online space in which the Institute will meet over the course of the year including introducing participants to the Google Sites space, how to post and edit on the wiki and establishing expectations for the monthly status reports. This space will provide a key component of the project since it will mark the progress of the developing use cases and the developing augmentation of NEMA and ARLO based on use case needs and become the basis of the final recommendations offered by the Institute for scholars, computer scientists, and librarians and archivists interested in participating in further development of the HiPSTAS infrastructure.
2:00 pm - 3:00 pm	Small group break-out discussions on defining use cases and re-articulating project goals with Co-PIs Clement and Auvil will also work with participants to re-articulate individual project goals and needed resources, and to create a project plan with proposed deadlines.
3:00 pm -	Large group discussion on issues arising in small groups

4:00 pm	
	Optional tour of musical venues in Austin

Day 4

8:30 am - 9:00 am	Continental Breakfast [*UT iSchool Lab*]
9:00 am - 12:00 pm	**Lab: Using High Performance Sound Technologies, Introduction to Classification in NEMA** [*David Tcheng*] NEMA provides an open and extensible web service-based resource framework that facilitates the integration of music data and analytic/evaluative tools that can be used by the global music information retrieval (MIR) and computational musicology (CM) research and education communities on a basis independent of time or location. The NEMA Do-It-Yourself (DIY) interface provides users with tools to prepare and execute analysis. The NEMA DIY has been used to facilitate the Music Information Retrieval Evaluation eXchange (MIREX), which is an annual evaluation campaign for Music Information Retrieval (MIR) algorithms. Participants will use NEMA primarily for classification (or supervised learning). First, participants will label a set of features from the files they chose for analysis. Features are extracted (with machine learning) from the labeled examples and then are used to predict the label or class to create a classification model. The classification model is used to automatically find new examples of each category. Several examples of classification in NEMA may be relevant to the spoken word collections, like Audio Music Mood Classification, Audio Tag Classification, Structural Segmentation, etc. Participants will review data that results from each type of classification of the audio files they chose for analysis.
12:00 pm - 2pm	Box lunches and closing remarks

January 2014: Virtual Meeting

B-Side Meeting, May 2014, UT Austin iSchool or University of Pennsylvania, Kelly Writer's House

Day 1

Time	
8:30 am - 9:00 am	Continental Breakfast
9:00 am - 12:00 pm	Participant panels and Responses (open to public)
12:00 pm - 1:00 pm	Lunch on your own

1:00 pm - 4:00 pm	Participant panels and Responses (open to public)

Day 2

8:30 am - 9:00 am	Continental Breakfast
9:00 am - 10:00 am	Planning writing recommendations
10:00 am- 12:00 pm	Small groups break out to write sections of recommendations
12:00 pm - 1:00 pm	Working Lunch: Large group discussion
2:00 pm - 3:30 pm	Writing Workshop: pulling together the pieces of small working groups
3:30 pm - 4:00 pm	Concluding Remarks

Appendix C: Readings

- *On Critical Listening and Sound Studies*

  Bernstein, Charles. "Introduction." In *Close Listening: Poetry and the Performed Word*. Oxford University Press, 1998: 3-26. Print.

  Morris, Adalaide (ed.). *Sound States: Innovative Poetics and Acoustical Technologies*. The University of North Carolina Press, 1998. Print.

  Tsur, Reuven. "What Makes Sound Patterns Expressive." In *What Makes Sound Patterns Expressive?: The Poetic Mode of Speech Perception.* Duke University Press, 1992: 1-110. *Print.*

  Rodgers, Tara, ed. "Introduction." *Pink Noises: Women on Electronic Music and Sound*. Duke University Press Books, 2010: 1-23. Print.

  Sterne, Jonathan. "Techniques of Listening." *The Audible Past: Cultural Origins of Sound Reproduction.* Durham, NC: Duke University Press, 2003: 87-136. Print.

- *On Infrastructure Development in the Digital Humanities*:

  Borgman, Christine L. "The Digital Future is Now: A Call to Action for the Humanities." *digital humanities quarterly* 3:4 (Fall 2009). Accessed August 31, 2011. http://www.digitalhumanities.org/dhq/vol/3/4/000077/000077.html.

  Clement, T., Tcheng, D., Auvil, L., Capitanu, B. Monroe, M. "Sounding for Meaning: Using Theories of Knowledge Representation to Analyze Aural Patterns in Texts" (under review).

  Drucker, Johanna. "Blind Spots." Chronicle of Higher Education. Chronicle of Higher Educ., 3 Apr. 2009. Web 3 March 2012.

  Flanders, Julia. "The Productive Unease of 21st-century Digital Scholarship." *digital humanities quarterly* 3:3 (2009). Accessed 24 Feb. 2012. http://digitalhumanities.org/dhq/vol/3/3/000055/000055.html.

- *On Music Information Retrieval and Visualization*

  Agustin A. Araya (2003). The Hidden Side of Visualization. *Techné: Research in Philosophy and Technology* 7 (2):74-119.

  Bernstein, Charles "Making Audio Visible: Poetry's Coming Digital Presence." In *Attack of the Difficult Poems: Essays and Inventions.* University Of Chicago Press, 2011: 107-119. Print.

  Downie, J. Stephen. Music information retrieval (Chapter 7). In *Annual Review of Information Science and Technology* 37, ed. Blaise Cronin, 295-340. Medford, NJ: Information Accessed 24 Feb. 2012. http://music-ir.org/downie_mir_arist37.pdf

  Drucker, Johanna. "Humanities Approaches to Graphical Display." *Digital Humanities Quarterly* 5.1 (2011): n. pag.

  Sterne, Jonathan. "Conclusion: Audible Futures." *The Audible Past: Cultural Origins of Sound Reproduction.* Durham, NC: Duke University Press, 2003: 335-351. Print.

- *On Sound Preservation*

  Bernstein, Charles. "The art of Immemborabiliy" In *Attack of the Difficult Poems: Essays and Inventions.* University Of Chicago Press, 2011: 91-105. Print.

  Council on Library and Information Resources and the Library of Congress. "Sound Recording Collections: An Overview of Preservation and Public Access in the Twenty-first Century." In *The State of Recorded Sound Preservation in the United States: A National Legacy at Risk in the Digital Age.* National Recording Preservation Board of the Library of Congress.

Aug. 2010: 9-65. Accessed 24 Feb. 2012. http://www.clir.org/pubs/reports/pub148/reports/pub148/pub148.pdf

Sterne, Jonathan. "Audile Technique and Media." *The Audible Past: Cultural Origins of Sound Reproduction.* Durham, NC: Duke University Press, 2003: 137-286. Print.

Sterne, Jonathan. "A Resonant Tomb." *The Audible Past: Cultural Origins of Sound Reproduction.* Durham, NC: Duke University Press, 2003: 287-333. Print.

- *On Native American Archival Materials*

Gottlieb, Peter. "Archivists and the Challenge OF Cultural Property." Plenary Address, April 29, 2010, Western Roundup (Seattle).

"Protocols for Native American Archival Materials." Northern Arizona University. Web. Accessed 3 Mar. 2012. http://www2.nau.edu/libnap-p/index.html.

Task Force to Review *Protocols for Native American Archival Materials* "Report of the SAA Task Force to Review the Protocols." The Society of American Archivists. 2008. Web. Accessed 3 Mar. 2012. http://www.archivists.org/governance/taskforces/0208-NativeAmProtocols-IIIA.pdf

Roy, Loriene and Alonzo, D. "Perspectives on Tribal Archives," *The Electronic Library* 21 (5) (2003): 422-427.

Underhill, Karen. "Protocols for Native American Archival Materials," *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* 7 (2) (2006): 134-145.