

AUGMENTING MUSICAL ARGUMENTS

Interdisciplinary Publishing Platforms and Augmented Notes

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From the beginning of my PhD program, I knew that I wanted to examine the intersections of music and poetry. I quickly realized that print media was not the ideal format for that examination. When analyzing a musical setting of a Victorian poem for a final paper, I painstakingly included annotated excerpts of a score in the appendix and a CD so that my professor could both see and hear the musical effects I was elucidating. Unfortunately, the professor was unable read music, so the score served no useful purpose, and he found it difficult and cumbersome to associate the musical passages I described in my essay with those on the CD. Without a way to immediately unite score and audio, I knew my arguments would continue to be unintelligible to my audience. Thanks to the training I received from Networked Infrastructure for Nineteenth-Century Electronic Scholarship (NINES) and the Scholars' Lab digital humanities fellowships at the University of Virginia, I began the process of building Augmented Notes, a tool to help make the highly specialized language of music accessible to nonmusicians.

Before I started building my own tool, I first surveyed other solutions to

this problem in publishing, both in print and online. In the 1960s and 70s ethnomusicologists often included LPs with their monographs so readers could hear the music the book described.¹ In the 1980s musicologists often replaced vinyl with cassette tapes.² By the 1990s monographs and textbooks often included CDs.³ However, these solutions require readers to go to the extra trouble of finding the exact measures of the song on the external audio files, and this additional step reduces the likelihood that anyone will actually follow the argument by listening to the music.

Recently, some monographs have started incorporating supplemental websites to better address this problem. The second edition of Mark Katz's *Capturing Sound: How Technology Has Changed Music* replaced the first edition's CD with a continuously updated website that includes the audio and video files mentioned in the book with cross-referenced page numbers.⁴ While this website enables readers to hear the music and audio in question, it still does not help readers find the exact musical phrases mentioned in articles, and those with less musical expertise will be left out of the conversation entirely.

Textbooks and print journals have followed suit: as a supplement to their anthologies of British literature, Broadview Press features a password-protected webpage that includes a section titled "Sounds of British Literature," which contains only recordings of sixteenth- and seventeenth-century songs.⁵ While it is vital for literary scholars to address musical settings of songs, it is equally important to provide the score as well as the audio. The Norton anthologies for music also have elaborate websites, which include "Listen For" tutorials. These tutorials have short videos for selected songs that feature one-sentence voiceovers explaining the importance of the excerpt, followed by labeled annotated timelines of the score's structure, which become filled by a black bar as the audio track progresses through the song. While this method provides a detailed, guided tour through portions of particular songs, it does not include images of the score itself, which makes it less useful for my purposes. The *Journal of the American Musicological Society* has perhaps the best model—when users click on an article with audio, the journal displays the score excerpt and plays the corresponding audio—but even this framework is limited: the journal is primarily distributed in print, and accessing the web framework, which is protected through a paywall, is cumbersome.⁶ Additionally, although the audio and score are presented together, the score is not highlighted in time with the audio: this omission is not a problem for musicologists (the primary audience for JAMS), but it would present a problem to readers who are not music specialists.

In recent years the digital sound studies community has produced a growing number of multimedia archives, but these generally opt to privilege either the score or the audio. For example, the English Broadside Ballad Archive (EBBA) at the University of California, Santa Barbara, is bringing musical settings to the fore by digitizing almost eight thousand ballads from England, and it includes facsimiles, transcriptions, and, when available, audio recordings of the ballads.⁷ It also contains some essays and visualizations (including graphs and maps) of different aspects of the songs, making it an excellent resource that furthers the goals of sound studies. However, since printed ballads often included only the words and not the scores, this site reproduces that publishing strategy, sidestepping the problems inherent in making musical scores legible to nonmusicians.⁸

Recently, scholars and programmers have tried to address this problem by finding new publishing strategies to incorporate music in academic articles, as SoundCite and Scalar have demonstrated.⁹ SoundCite is a tool that lets users embed sound clips in websites by following three easy steps. It enables users to place the audio file in line with the text, and even overlapping with it, so that clicking on a phrase will begin playing an audio file of that phrase. This tool is incredibly useful for publishing articles online if users are only concerned with linking audio to text, but it does not support linking audio to score images, and it sometimes glitches on mobile devices and when used with WordPress. Scalar is a publishing framework that lets users annotate media and superimpose those annotations, so users can add links and text to appear in any audio or video file. Again, however, users cannot synchronize an audio file and score, so any included scores will still be illegible to nonmusicians. Other attempted strategies include interactive CDs designed to guide newcomers to classical music through some canonical works, MIDI plug-ins for web browsers, and flash-based animated scores.¹⁰ Some musicology periodicals have opted for an exclusively digital form to embed MP3s or YouTube videos into their analyses.¹¹ However, none of these projects feature good-quality audio integrated with a score, and many rely on outdated technology. The other popular option involves using video-editing software to create short film clips by manually synching scores with audio files and then posting the clips on YouTube as animated scores. While this strategy can produce an end result similar to what I had envisioned, video-editing software can be quite expensive and cumbersome, and I was looking for a tool designed to bring score and sound together, rather than one that could be rigged to do the job.

After surveying the available digital tools and projects, I concluded that

nothing existed that suited my needs: I wanted to build a new publishing framework to combine audio, score, and analytical commentary in which every measure of a score would be highlighted in time with the music from an audio file. I was fortunate to have been a member of the first Praxis Program cohort with the Scholars' Lab at the University of Virginia, a graduate fellows program that gives students an intensive education in digital humanities. From that experience, I learned enough programming and basic web development to build *Songs of the Victorians*, an archive and analysis of Victorian song settings of contemporaneous poems.¹² Each archive page includes a recording of a Victorian song synced with its first-edition printing so that every measure of the song is highlighted in time with the music. *Songs of the Victorians* also has article-length analyses of these songs, which explain how the musical settings function as interpretations of their lyrics. The articles use fragments of these integrated scores as excerpts to support my analyses of the gender politics of each song: wherever I elucidate a phrase of the song, I supplement the analysis with a hyperlink (a speaker icon) that, when clicked, reveals the corresponding excerpt in which the score is highlighted in time with the audio. For example, when discussing political activist, marriage reformer, and composer Caroline Norton's best-selling song "Juanita" (1853), I use this excerpting framework to show how a musical allusion makes the song into a subtle critique of marriage rather than an endorsement of it. The melody for the first four bars of the chorus (on the words "Nita, Juanita, Ask thy soul if we should part") is the same as the melody from Handel's aria "Lascia ch'io pianga" from the opera *Rinaldo* (1711), in which an imprisoned woman laments her fate and dreams of freedom. I use the excerpting framework to play the Handel excerpt and Norton excerpt side by side so users can hear the similarities and then more readily believe my argument: that Norton used this allusion to suggest that marriage is a type of imprisonment and that Juanita, like Norton herself, wishes for freedom from a husband.

This framework made possible my interdisciplinary scholarship: without *Songs of the Victorians*, I would have been unable to convince my readers that women musicians could use these disarmingly simple songs, often performed in the parlor as part of a courtship ritual, to unsettle the gendered status quo, from queering the heteronormative space of the parlor to taking greater agency in courtship to critiquing marriage laws. This digital publishing framework enables literary scholars without musical experience to follow arguments that, when presented simply as musical notes printed on a page, were completely inaccessible. It has also been invaluable in conference



FIGURE 9.1 Box-drawing page of Augmented Notes.

presentations: multiple scholars have informed me that they had previously been intimidated by interdisciplinary arguments involving music, but the highlighting framework gave them new confidence in and understanding of such arguments.

The framework was so popular that I had requests to build similar sites for other scholars' conference presentations, archives, books, and articles. As I could not build customized sites for everyone, I created Augmented Notes, a generalized public humanities tool that allows users to integrate an audio file with a score to use in both academic arguments and digital archives.¹³ Augmented Notes takes audio files and score images and combines them into webpages where each measure of the score is highlighted in time with the audio so that everyone, regardless of musical literacy, can follow along. It is simple to use and eliminates the need for users to understand programming. After uploading audio and image files, users are taken to a page where they click and drag to draw boxes around each measure. Users can change the size and position, numbering, and alignment of boxes (or delete them, as well). Once the entire score has been appropriately highlighted, users can proceed to the time editing page.

Das Wohltemperierte Clavier I
Prelude 1
Johann Sebastian Bach (1685-1750)
BWV 846

Public Domain

0:12 / 1:54

Save Back to start

2.37
3.95
5.6
7.13
8.66
10.24
11.8
13.37
14.86
16.44
17.97
19.62
21.7
22.7
24.24
25.87

FIGURE 9.2 Time-editing page of Augmented Notes.

On the time editing page, users annotate each measure with the time when that measure ends in the audio: here, a scholar listens while the audio plays and hits a button as the audio reaches the end of each measure, thus marking the measure boundaries, which records the timestamp in the input boxes on the right-hand side of the screen. Users continue recording timestamps until the entire score has been processed. They can edit any of the timestamps, jump forward and backward by measure, and go back to the start to observe whether they properly aligned the audio with the score. Once the user is satisfied with the measure locations and times, Augmented Notes exports the measure and time information necessary to highlight each measure of the song in time with the music. Users then download a zip file with the HTML, CSS, and JavaScript files necessary for an integrated archive page, which they can then restyle themselves.

Augmented Notes also has a sandbox where users who would like to experiment with the technology but do not themselves have the requisite files can try it out.¹⁴ This demo page includes the score and audio to Bach's Prelude No. 1 in C major (BWV 846). This song perfectly encapsulates Augmented

Your Title Here

▶ 0:00 / 1:54



Das Wohltemperierte Clavier I Prelude 1

1

Johann Sebastian Bach (1685-1750)
BWV 846

4

7

10

13

16

Public Domain

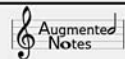


FIGURE 9.3 Customizable output of Augmented Notes.

Notes, because the score and audio are in the public domain (echoing the tool's open-source policies) and also because this piece opens Bach's *Das Wohltemperierte Klavier*, an influential series of keyboard pieces composed to show off the advantages of a new system of keyboard tuning. Since *Das Wohltemperierte Klavier* was Bach's attempt to unite the written and the aural while using a new technology, it nicely parallels the purpose of Augmented Notes, which is also a new system for combining the written and the aural.

Augmented Notes is already being used by scholars for archival projects, such as *Romantic-Era Lyrics* from the University of South Carolina and *Sounding Tennyson* from the University of Cambridge. It also has pedagogical uses: professors can use the interactive scores to teach or test basic score-following in music appreciation classrooms or to highlight particular motives buried in orchestral scores in more advanced classes. Because it is free, open source, and usable by anyone with computer access, scores, and audio files, it can preserve any musical cultural record and can be used for scholarly or nonscholarly purposes. It was voted first runner-up in the DH awards 2013 competition in the "best DH tool or suite of tools" category.¹⁵

I am currently designing options for greater user customization: specifically, I want to support highlighting musical units other than measures (including individual notes) and to allow users to draw shapes other than rectangles around the music. Additionally, I plan to build greater support for MEI (Music Encoding Initiative). Developed by Perry Roland at the University of Virginia, MEI is a type of XML for the scholarly encoding of music, just as TEI is designed for the scholarly encoding of text.¹⁶ It is quickly becoming the standard markup for scholarly digital editions of scores. With MEI scholars can encode a measure of music in a method similar to encoding a section of a poem in TEI: they can mark up the measure, staff, chord duration, notes, and instrumentation as one might mark up a stanza, lines within a stanza, the rhyme scheme, and the speaker. Although Augmented Notes can import bar line positions and timestamps from MEI, it does not yet export MEI, and this additional functionality would increase the tool's interoperability and usefulness in the greater digital sound studies community. For instance, MEI capabilities would let me partner with Edirom, a music editor that enables the collation of music marked up in MEI so that users can easily compare multiple performances of the same song.

Although currently the site only produces archive pages, I am expanding its functionality to accommodate an excerpting framework. After syncing the score with the audio, users will be able to select the starting and ending

points for different excerpts and the caption for these excerpts. The output will include a second HTML file that contains the excerpts, labeled and listed in order, onto which users can add the surrounding analytical text. I have already used this strategy in *Songs of the Victorians*: when the commentary discusses a particular measure, the users can click on an icon of a speaker to highlight the relevant measures of the score in time with the audio so they can hear for themselves the effect the commentary describes.

I was able to learn the HTML, CSS, and JavaScript necessary for Augmented Notes only because of my graduate school training. I became a fellow with NINES early in my PhD program, during which I learned TEI and the importance of archives and developed enough basic web development skills to build the prototype for *Songs of the Victorians*. NINES granted me a scholarship to attend the Digital Humanities Summer Institute (DHSI), where I took “Multimedia: Design for Visual, Auditory, and Interactive Electronic Environments,” an intensive weeklong training program that prepared me for my next experience: I was one of six students in the first Praxis Program cohort at the Scholars’ Lab at the University of Virginia. We had weekly meetings in which we learned best practices of digital humanities, including designating credit, drafting project charters, project management, web design, and basic programming. We worked closely with the Scholars’ Lab staff, and each Praxis student developed specialties—including coding, design, and project management—in addition to expanding our generalist knowledge, ensuring that the developers could communicate clearly with the designers at all times. We were also an interdisciplinary group, so we gained experience collaborating with others outside our academic fields. Over the course of the year, we worked together to build a tool—Prism—for analyzing and comparing crowdsourced interpretations of text, and the following year the Praxis cohort added to it. As lead developer on the project, I got a crash course in JavaScript and CoffeeScript, which helped me refine the code underlying *Songs of the Victorians*, and my newfound knowledge of best design practices inspired me to completely redo the interface for the site. It was during that year that I came up with the idea for Augmented Notes, and the project management skills I acquired during Praxis enabled me to break the project into its smaller components and stay on task building it during my year as a Scholars’ Lab fellow.

The fellows program enables up to three students each year to work closely with the Scholars’ Lab staff on a research project of their choice and pays enough to reduce their teaching loads for at least a semester so they

can focus on completing the project by the end of the year. With the advice and training of the Scholars' Lab, I further revamped *Songs of the Victorians* and created *Augmented Notes*. The three fellowship programs gave me the support, knowledge, and funding required for my project: without their help, I would have been unable to build my site and therefore unable to pursue my dissertation topic. Since I was writing a full-length dissertation in addition to building two digital projects, their support was particularly invaluable. Because their support enabled me to build my interdisciplinary projects, it also led first to my junior faculty position as Assistant Professor of Interdisciplinary and Digital Teaching and Scholarship at SUNY New Paltz, and later, to my position as the Digital Humanities Specialist at Tufts University. *Augmented Notes*, and graduate training in digital humanities more generally, truly shaped my career trajectory.

As my own history shows, new media enable new arguments: without *Augmented Notes* to unite audio with score, I would have had to abandon my arguments about performances of Victorian songs, as my ideas needed a new structure that incorporated sound to be legible to nonspecialists. In fact, given the rise of digital publishing options for sound studies, evidenced not only by this collection but also by the rise of companion websites for textbooks and monographs and other standalone websites and tools, it is not a surprise that sound studies is experiencing a resurgence. However, as more publishers begin to explore options for digitally representing sound, we must make sure that the digital tools that make such work possible are not limited to people with the prestige and clout to access them: rather, we should continue to produce and improve the open-source and open-access tools that make our scholarship possible for everyone, from graduate students and independent scholars to endowed chairs. Since our scholarship is often limited by our technology's ability to represent the art we analyze, we must continue to challenge our current publishing models to create the scholarship our art deserves.

NOTES

- 1 Søgård Jørgensen's *Qavaat* and Edström's *Sámisk musik* are just two examples of this trend.
- 2 For example, musicologist Nicholas Temperley's special edition of *Victorian Studies* included a cassette tape with the songs discussed in the articles.

- 3 This common technique is seen in such works as Rice's *May It Fill Your Soul*, Watkins's *Proofthrough the Night*, and Turino's *Music as Social Life*.
- 4 Hosted by University of California Press, the companion website for Katz's book is at www.ucpress.edu/go/capturingsound.
- 5 Pinch and Bijsterveld's *The Oxford Handbook of Sound Studies* also has a companion website with links to websites, MP3 files, and YouTube videos that are referenced in the text, but they do not include any transcriptions or scores; Boretz, Morris, and Rahn's *Perspectives of New Music* also includes a digital appendix.
- 6 Saavedra, "Carlos Chávez's Polysemic Style."
- 7 English Broadside Ballad Archive.
- 8 Douglass and Burwick's Romantic-Era Songs project, which contains popular settings of Romantic poems, adopts a similar strategy: it includes introductory materials for each song or set of songs, audio files (MP3s), and the occasional transcription of the words, but the omission of scores hampers a truly interdisciplinary analysis.
- 9 SoundCite, from Northwestern University Knight Lab (accessed February 28, 2015, <http://soundcite.knightlab.com>); and Scalar, from the University of Southern California (accessed February 28, 2015, <http://scalar.usc.edu/scalar>).
- 10 MIDI Sheet Music (accessed November 27, 2017, <http://sourceforge.net/p/midisheetmusic/wiki/Home>) and Sibelius Scorch (accessed February 28, 2015, www.sibelius.com/products/scorch/index.html) are MIDI-based, whereas Variations, developed at Indiana University (accessed February 28, 2015, <http://variations.indiana.edu/use/index.html>), is the most sophisticated flash-based approach.
- 11 For example, *Inbhear: Journal of Irish Music and Dance* (accessed February 28, 2015, www.irishworldacademy.ie/inbhear) and *Echo: A Music-Centered Journal* (accessed February 28, 2015, www.echo.ucla.edu) incorporate MP3s and videos.
- 12 You can visit the website at www.songsofthevictorians.com.
- 13 See *Augmented Notes: A Tool for Producing Interdisciplinary Music and Text Scholarship* (accessed November 27, 2017, www.augmentednotes.com).
- 14 For the sandbox, see www.augmentednotes.com/example.
- 15 "Digital Humanities Awards."
- 16 For more on MEI, see McIntire Department of Music: Music Encoding Initiative (accessed November 27, 2017, <http://music.virginia.edu/mei>). MEI's better-known counterpart, MusicXML, is another XML for music designed mainly for formatting music in composition programs such as Sibelius (accessed November 27, 2017, www.avid.com/sibelius) and Finale (accessed November 27, 2017, www.finalemusic.com). MEI enables scholars to show "areas where multiple readings or realizations of the musical content—drawn from different sources—are possible, or encode information indicating that a different hand was used to write a section, or even a particular symbol, of a manuscript. Multiple media may also be related to the encoding, providing

methods of associating audio recordings or scanned images with the musical content.” Roland, Hankinson, and Pugin, “Early Music and the Music Encoding Initiative,” 610.

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