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Digital Evolution: How the Development of Digital Audio Technologies Have Changed the Way Video Game Composers Create Music

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Publication Statement

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Annotated Bibliography

Essays in Collections

1) Medina-Gray, Elizabeth. "Interacting with Soundscapes: Music, Sound Effects, and Dialogue in Video Games." In *The Cambridge Companion to Video Game Music.* Edited by Melanie Fritsch and Tim Summers, 176-192. Cambridge University Press, 2021.
   Dr. Elizabeth Medina-Gray is currently an Associate Professor of music theory at Ithaca College. In this paper, she addresses the three pillars of game audio consisting of music, sound effects, and dialogue. She takes time to define each one in great detail and how they individually contribute to the soundscape of the game as a whole before delving into her main argument that there is much overlap in the way they are used in games. This assertion is explored in early video games where distinct sound effects and music were often programmed onto the same channel due to limitations, and in more modern examples where pitched sounds are cleverly manipulated to fit into the musical context of the larger musical score. The author utilizes many examples from specific tracks, refers to studied scholars in music, and provides a brief score study that helps illustrate her point. This work clearly illustrates certain throughlines in compositional approach over time, but equally illuminates how the advancements in technology have increased fidelity and flexibility with which composers can utilize such techniques to enrich a player's in-game experience.

2) Michelmore, Guy. "Building Relationships: The Process of Creating Game Music." In *The Cambridge Companion to Video Game Music.* Edited by Melanie Fritsch and Tim Summers, 64-73. Cambridge University Press, 2021.
   Guy Michelmore is an award-winning film, games, and TV composer who has composed for productions by companies such as Marvel, Dreamworks, and Disney. This essay outlines in general strokes the process a modern-day composer goes through to create a video game soundtrack from beginning to end. He does not cite a large number of sources, but it is assumed he pulls on his own experience for much of his insight. The sources he does cite consist of writings by other prominent game composers, books on video game music, and scholarly journal articles. He discusses how composers come up with a musical strategy before delving into the details of how the score will interact with the game and the player. He explains the appeal of the rather new phenomenon known as a dynamic music system, which utilizes several triggers and unique musical cues in different orders and combinations to change the music in real time as the player interacts with the game. In his discussion of trends within modern games, he mentions a rising pattern in which composers will employ the help of a few soloists to record and implement into the score, much the same as Austin Wintory demonstrated in his video diary. The last

section of this essay explores how game music can live on outside of the game itself in popular culture.

3) Newman, James. "Before the Red Book: Early Video Game Music and Technology." In *The Cambridge Companion to Video Game Music.* Edited by Melanie Fritsch and Tim Summers, 12-32. Cambridge University Press, 2021.

Dr. James Newman is a Research Professor in Media at Bath Spa University and has written scholarly work on video games for over 20 years. In this recent account, Newman rallies for the respect of early video game music and argues for a more nuanced approach to how it is studied and classified. He mentions that many instances of generalization, such as the use of 'chiptune' to represent all game music from the 70's-90's serve to erase the individuality of the hardware of the time and the voices of the composers who came up with creative ways to compose through them. Throughout his writing, he references several game's soundtracks and prevalent game composers overlapping with many of the examples present in Tobias Banks' work. He also references Junko Ozawa, a "legendary composer and sound designer" who gives an account of her work in an interview below. This essay is a somewhat more emotionally charged, but valuable source of information on what it was like to compose for video games at the end of the 20th century.

4) Ozawa, Junko. "Waveform Wizard: An Interview with Composer Junko Ozawa." In *The Cambridge Companion to Video Game Music.* Trans. by Lyman Gamberton. Edited by Melanie Fritsch and Tim Summers, 52-28. Cambridge University Press, 2021.

Junko Ozawa is a Japanese video game composer known for her work on games such as *Galaga* and *Rolling Thunder*. She is referenced in several of the other works listed in this bibliography, lauded as a legend. In this relatively brief interview, an overview of Ozawa's life leading up to and into her time working at the Namco game studio is presented with additional time then being spent detailing some of the ways she utilized the limited software and hardware of the time and manipulated it to serve her and the music she made in the 80's and 90's. Ozawa serves as a primary source of what it was like to compose for games in that era. In a closing statement, she supports the implementation of education on game audio and declares games to be an important part of culture that will only become more ingrained. This view is aligned with sentiments put forth by scholars such as Martin Emo.

5) Paul, Leonard J. "Droppin' Science: Video Game Audio Breakdown." In *Music and Game Perspectives on a Popular Alliance*. Edited by Peter Moorman, 63-80. Berlin, Germany: Springer Fachmedien Wiesbaden, 2013.

Leonard J. Paul is a practiced game composer who began his work scoring games with the early systems of the Sega Genesis and NES. He additionally teaches game audio students online through the School of Video Game Audio of which he is a co-founder. In this essay, Paul breaks down the many facets that can go into an interactive music system, a development which

he describes as "...an exciting new area for creativity and research…" Using much of the same language as in the Michelmore essay, he demonstrates several of the techniques rearrange and alter music mid-game that modern technology allows before delving into the early history of video games and describing how innovations from the composers of the 80's and 90's, such as Koji Kondo, are still informing how game scores are made today. Throughout the work, he references interviews and talks from prominent game composers, specific systems from games, and his own personal experience with the games he has worked on. This essay serves as a great source for the new ways in which composers can approach music in this digital age.

6) Reale, Steven. "Analytical Traditions and Game Music: Super Mario Galaxy as a Case Study." In *The Cambridge Companion to Video Game Music.* Edited by Melanie Fritsch and Tim Summers, 193-219. Cambridge University Press, 2021.

Dr. Steven Reale is a music theorist, ludomusicologist, and theory professor at Youngstown State University. He is a very accomplished researcher and has been in the field for over a decade. This essay takes a magnifying glass to the *Super Mario Galaxy* soundtrack through three different theoretical lenses: Formal Analysis, Reductive Analysis, and Transformational Analysis. Reale provides a section for each in which he takes excerpts from the game's music and analyzes them with each technique. Through this practice, he demonstrates his main argument that traditional music theory techniques must be stretched and adapted in order to accurately consider the dynamic essence of modern game music. Throughout the paper, the author references several scholars from a variety of fields, from other musicologists to philosophers. He also often simultaneously utilizes and criticizes the works of David Lewin, a well-known American music theorist. This essay delves into the details of interactive music within this particular game, a system only possible through modern digital technology. And as these newfound techniques have found their way into common use, Reale highlights the development that still needs to be done in order to accurately study them.

Scholarly Journal Articles

7) Banks, Tobias. "The Wrong Tool for the Right Job: Composition on 8-Bit Machines." *INSAM, Journal of Contemporary Music, Art, and Technology,* no. 3 (December 2019): 69–81. https://insam-institute.com/wp-content/uploads/2019/12/INSAM-Journal-of-Contemporary-Music-Art-and-Technology-Issue-3-December-2019-6.pdf.

Tobias Banks at the time of publishing was a student at California State University Long Beach as a composer of electronic and acoustic music. This article takes a look at early game music by analyzing how composers utilized the capability of the three of the most prevalent pieces of hardware of the 80's and 90's: the Commodore 64, Nintendo Entertainment System (NES), and the ZX Spectrum. Banks addresses the unique parameters present in these systems and the lengths at which composers and programmers went to create music with limits on the time, simultaneous channel usage, and computational output. He cites specific tracks from games

from the time period as well as interviews from industry professionals and other scholarly game journals. This piece of writing represents a valuable look at what early digital composition looked like, allowing a baseline from which to study developments that came about later on.

8) Behr, Adam, Keith Negus, and John Street. "The Sampling Continuum: Musical Aesthetics and Ethics in the Age of Digital Production." *Journal for Cultural Research* 21, no. 3 (2017): 223–240. https://doi.org/10.1080/14797585.2017.1338277

      The authors of this work consist of two professors (John Street and Keith Negus) and a voice-over artist (Adam Behr), representing a diverse range of voices to discuss this topic. The topic at hand is sampling technology, its origins, morality, and copyright law. The main argument of this piece is a sort of reframing of the way people look at sampling. As opposed to the often taken viewpoint that sampling is a form of stealing, the authors argue that the technique should be viewed on a "musical continuum", relating it to other forms of 'copying' in music such as allusion, quoting, and themes. The authors view the modern development of digital production in general to be a beneficial truncation of the production process that assists those less skilled in learning how to make use of it. Additionally, their sentiment that the process of producing music is where creativity can be found is very much in line with Banks and Verderosa, one supporting this idea in the modern day and the latter in the ingenuity of early game composers. This source uses several interviews from well-known musicians, specific songs, and excerpts of trial and law to support its arguments. Its relevance to this topic lies in its detailed look at one of the main pillars of how game music is made nowadays with sampled sounds being an essentially inevitability.

9) Emo, Martin. "Ableton Live Professional Learning Development for Secondary School Music Teachers." *Journal of Music, Technology and Education* 14, no. 1 (2021): 43–68. https://doi-org.du.idm.oclc.org/10.1386/jmte_00033_1.

      A former high-school teacher, Martin Emo (at the time of publishing) was a Ph.D student at Te Herenga Waka-Victoria University in Wellington, New Zealand. He holds several national roles within the New Zealand education system. This essay presents the process and findings of a research study focused on determining the most effective way to educate teachers on modern digital audio technology, specifically the DAW (Digital Audio Workstation) Ableton Live, so that they may teach a new generation of students that pursues such musical avenues. This endeavor underpins the author's argument that education should be shifted to include curriculum on digital audio technology to better serve modern students. Emo takes time to address some of the criticisms of this approach, with some warning against a learning atmosphere in which "all opinions of music are valid" or content is limited to "what the students already know or are interested in," but essentially refutes these with positive findings from the study. This work is inundated with citations from scholarly sources, denoting that much research and effort went into this piece. This essay, though not directly tied to composing for games, deals with the technology

that almost all of them use in the modern era and demonstrates the repercussions of such a monumental shift in the way music is currently being made.

10) Matz, John Robert. "Scoring Mythology, Megacorps, and Magic: The Music of Mythgard."
Journal of Sound and Music in Games 3, no. 1 (2022): 60–63. https://online-ucpress-edu.du.idm.oclc.org/jsmg/article/3/1/60/119545/Scoring-Mythology-Megacorps-and-MagicThe-Music-of.

   John Matz is an award-winning video game composer, instrumentalist and educator based in Chicago. In this selection, Matz discusses his work on the online card-game, *Mythgard*, developed by Rhino Games. He delves into the details of the interactive music system (a rather modern development in game scores) utilized during gameplay that enhances the players' experience through exciting musical cues and strategic track-switching when game triggers are reached. This information is relevant due to the reliance on recent digital audio technology for such systems to function. The author goes on to describe the fusion of orchestral and electronic styles that make up the basis of the game's musical identity, briefly mentioning other mediums he pulled inspiration from.

11) Verderosa, Tony. "Sound Design Part 1." *Modern Drummer* 46, no. 8 (2022): 56–59.
https://du.idm.oclc.org/login?url=https://www.proquest.com/magazines/sound-design-part-1/docview/2700398061/se-2.

   Tony Verderosa is a drummer, composer, and sound designer who has performed with the likes of Katy Perry, Jay-Z, and Lady Gaga. This article addresses many of the overlaps that exist between what might be considered pure sound design versus music. He mentions that in the modern era, it is often difficult to distinguish the two because of the increased digital manipulation of sounds and music through MIDI and digital audio technologies. The author pulls on his own experience with creating digital music and cites examples from prominent composers and musicians, such as Dave Porter. Verderosa states that his own goal as a sound designer is to "...create a sound that I have never heard before…", and encourages composers to take default sounds and experiment with them.

   <u>Miscellaneous</u>

12) Wintory, Austin. "How I wrote 2 minutes of Aliens Fireteam Elite music." Filmed August
27, 2021. YouTube video, 20:08. https://www.youtube.com/watch?v=OiAHpenmbLY.

   Austin Wintory is a grammy-nominated video game composer who is known for his work on titles such as *Journey, Flow,* and *Abzu.* Additionally, he is a great resource to the gaming community with his youtube channel and involvement with gaming podcasts that shed light on the inner-workings of the music side of the gaming industry. In this video, Mr. Wintory documents his process for writing a battle track for the Aliens Fireteam Elite video game, displaying many of the tools available to the modern video game composers. Throughout the

process, he continually demonstrates the manipulation, visualization, and playback of sound through a digital audio workstation. He utilizes recordings of musicians, both live and remote, and recordings of his own playing of mundane objects within his personal studio. In addition, the ability to collaborate with other artists across the world is exemplified in this video as Mr. Wintory employs the help of fellow composers to help achieve the sound he requires. This video represents a culmination of years and years of technological development in digital audio and recording ability and shows a large slice of the plethora of tools at the disposal of just one composer in today's world.