

Andrew Schartmann

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Andrew Schartmann is a professor of music at New England Conservatory and serves as audio director at Yale's XR Pediatrics video game lab. He is the author of several books including *Koji Kondo's Super Mario Bros. Soundtrack*.

What inspired you to write *Analyzing NES Music*?

Like a lot of people who grew up in the 80s and 90s I have a strong nostalgic connection to the NES. But my interest goes deeper than that. I was always struck by how inventive the music was, especially in light of the serious technological limitations these composers were dealing with. As someone who works in both music theory and sound design, I wanted to take this repertoire seriously and show that it rewards close listening and rigorous analysis. NES music is a perfect example of how constraint can drive creativity.

When I started this project in the mid-2010s, much of the scholarly focus in game music studies centred on interactivity – which makes sense, since that's one of the defining features of video game soundtracks. But that emphasis often led to early game music being dismissed or ignored, simply because the technology wasn't yet there to support complex interactive systems. A lot of early publications in the field sidestepped NES-era music entirely, calling it simplistic or excusing its limitations as merely technological.

I wanted to push back on that narrative – to evaluate this music on its own terms and show that it has tremendous value, even through of a non-interactive (or at least less interactive) lens. Something Koji Kondo once said has always stuck with me: that technology is a double-edged sword – one that can hinder creativity as much as it can foster it. NES music is a great test case for that idea.

How would you describe the book's main goal to someone who isn't deeply familiar with video game music?

The book stems from a very practical question – a kind of compositional puzzle that NES composers had to solve: How do you write music that repeats mercilessly without drawing attention to the fact that it's repeating? That challenge gave rise to an entire toolkit of creative strategies. As composer Neil Baldwin once put it, the goal was to 'create the illusion of variety'. At its core, the book tries to unpack how they did that.

Why focus specifically on the NES era? What makes that system's music worth deep analysis today?

The NES marked a turning point in video game music. It was one of the first systems that gave composers enough sonic flexibility to think musically rather than merely functionally – and Nintendo, as a company, actively embraced that potential. Under Hiroshi Yamauchi's leadership, there was a deliberate push to position music as a central element of game design, not just an afterthought. That institutional vision created space for composers to take risks, experiment and develop new approaches to game scoring. The results are often far more sophisticated than they appear at first glance.

It's also a fascinating repertoire to study because it served as a kind of crucible: there was no established model for what game music should sound like, so composers were inventing the medium in real time. The combination of creative freedom and extreme technological limitation led to an extraordinary burst of stylistic innovation – one that laid the foundation for countless conventions still in use today. So while NES music is historically significant, it also remains directly relevant to the way soundtracks are conceived and composed in contemporary games.

What defines the 'NES sound' from a musical standpoint?

The 'NES sound' is shaped as much by what the system couldn't do as what it could. The console's sound chip offered only five channels – two pulse waves, one triangle wave, one noise generator and one sample channel – and only three of those were capable of producing pitched material. All were monophonic, meaning composers had to construct entire musical textures using just three single-line voices. What emerged was a sound defined by clarity, rhythmic vitality and economy of means. Composers developed distinctive techniques – rapid arpeggios to imply harmony, melodic counterpoint between pulse channels, nested loops to create variety through repetition – that compensated for the system's limits and, in doing so, created a highly recognizable aesthetic. It wasn't just about writing good tunes – it was about making the most of every available byte and every voice on the chip. Over time, these constraints became part of the NES's sonic identity and, even today, many of the gestures that originated from those early limitations continue to resonate in chiptune and retro-inspired scores.

What musical forms or techniques are most common in NES music (e.g., looped structures, modal harmony)?

Looped structures are everywhere, but what makes NES music so fascinating is the ingenuity with which composers handled them. A common strategy was to build short, reusable musical units that could be reordered or recombined to stretch a small amount of material into something that feels far more expansive. The 'Overworld' theme from *Super Mario Bros.* is a well-known early example of this technique – but you can find it throughout the NES catalogue.

Variety wasn't just achieved through horizontal reordering, though. Composers also layered materials vertically, assigning contrasting loops or behaviours to different voices. For instance, the triangle channel might vamp on a simple bass line while the pulse channels engage in more elaborate melodic or contrapuntal dialogue. This layering of repetition techniques across voices created real textural depth and a sense of continuous forward motion – even within short, looping phrases.

Harmonically, transpositional sequences are everywhere – shifting a chord or motive up or down by a fixed interval. These patterns were not only musically effective; they were also easy to implement given the architecture of early sound programming. As a result, you often hear harmonies that fall outside traditional tonal syntax. A move from D major to E major, for example, introduces a G-sharp and lends the passage a Lydian flavour. So while the forms may be repetitive, the harmonic and textural language is often surprisingly colourful and dynamic.

Did you find any instances where NES composers used techniques borrowed from classical music theory?

Absolutely. Many NES composers had classical training, and you can hear those influences throughout the repertoire – especially in the way they shape phrases, build tension and release, and voice-lead (at least some of the time). But that's just one thread in a much broader stylistic fabric. NES music is incredibly eclectic. Alongside echoes of classical styles, you'll find influences from a wide range of popular music – rock, jazz, reggae and so forth – all adapted in inventive ways to fit the technical limits of the system.

These weren't genre exercises in the traditional sense, though; they were pragmatic, often hybrid constructions. Composers drew on whatever tools worked, whether that meant borrowing a classical cadential pattern or channelling the rhythmic drive of hard rock. So while you can absolutely trace classical techniques in the music, what makes this music compelling is how those ideas coexist with other traditions and are reimagined through the lens of limited hardware.

You chose five specific NES games to analyse in depth – what guided your selection of those particular titles?

Each game in the book was chosen to highlight a different facet of NES music and to show the sheer range of aesthetic and technical approaches that emerged on a single platform.

Super Mario Bros. stands out not just because it's iconic, but because Koji Kondo fundamentally enlarged the possibilities of what video game music could be. He moved away from the idea of background 'wallpaper' and instead made the music an active part of the gameplay experience – tightly aligned with how players feel physically while jumping, dodging, and navigating the screen.

Metroid blurs the line between music and sound effects – are we hearing instruments, or the sounds of alien life? That ambiguity isn't just a by-product of limited resources; it's part of the aesthetic strategy. The game deliberately plays with our expectations about what counts as music and what counts as sound and, in doing so, creates a world that feels unsettling and immersive. It really set the stage for later sound design practices that use this ambiguity to powerful effect. I often think of *Silent Hill* in this regard, where you can't always tell whether a sound is coming from the game world or from your own physical space.

Dragon Warrior helped to establish the musical conventions of the RPG genre, especially in its use of thematic cues to distinguish different regions of the game world. Motivic consistency across sequels also contributed to a strong sense of musical continuity and world-building. What's especially fascinating, though, is how composer Koichi Sugiyama approached the project with an orchestral mindset (he was a film and TV composer, after all), even when working within the limitations of the NES sound chip.

Mega Man 2 allowed me to explore the hermeneutic potential of musical analysis. In essence, the chapter asks how we can construct meaning by placing a game's music in its broader cultural contexts – art, aesthetics, historical moment? When you consider the soundtrack alongside visual art movements like Superflat, or the cultural mood of post-war Japan, new interpretive possibilities emerge. It's also my favourite NES game, so that also might have played a part in its inclusion.

And *Silver Surfer*, while not a well-known title gameplay-wise, contains one of the most technically ambitious scores ever written for the system. Tim Follin's music here is virtuosic and hyper-dense, pretty much the epitome of Baldwin's 'illusion of variety' characterization.

How do you think NES music shaped the evolution of video game soundtracks more broadly?

NES music laid the groundwork for many of the structural strategies we now associate with game scoring – looping, modular design, layering – all of which were developed in response to severe technological limitations. But the problems NES composers faced haven't gone away; they've just taken on new forms.

Today, players often spend hundreds of hours in a single game world. Even with vastly improved technology, you're still dealing with the challenge of listener fatigue. You can't write hundreds of hours of unique music, so you have to be clever about how material is reused, varied and layered to stay fresh. And NES composers were pioneers in this respect. They figured out how to build scores that were compact yet durable – music that could loop indefinitely without becoming grating, and that adapted rhythmically and emotionally to gameplay.

What do you hope readers, musicians, or even game designers will take away from *Analyzing NES Music*?

Ultimately, I hope the book helps people to appreciate these early scores in a new light. As I said earlier, NES music has a history of being dismissed as primitive but, in many ways, it's some of the most inventive game music ever written, if only because it had to be.

I also hope the book encourages readers to look more closely at how music functions within games more broadly. Whether you're a composer, theorist or designer, there's real value in understanding how musical form, texture and timing shape a player's experience. NES composers didn't have a lot to work with, but they used what they had brilliantly.

Where can readers go to learn more about your work or engage with you about this topic?

I love connecting with people on social media (Instagram, X, LinkedIn) and always welcome conversations with anyone curious about NES music, game audio or retro games more broadly. That's where I share updates on current projects, preview transcriptions and post the occasional behind-the-scenes look at my research. You can also visit my website (<https://www.andrewschartmann.com>) to explore more of my projects and publications, or check out one of my previous publications.

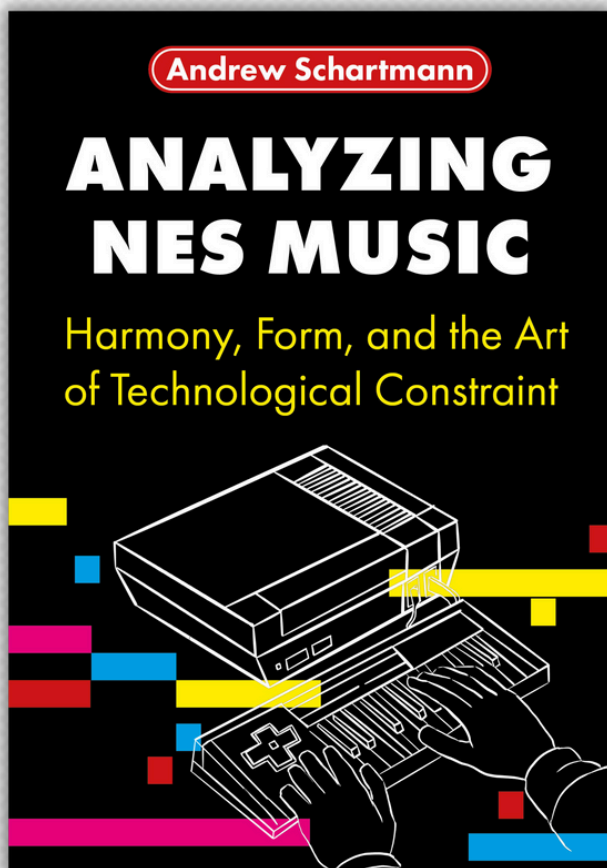
Are you planning any follow-up projects related to video game music?

Yes – several, actually. I’m currently developing an open-access NES transcription project that will provide accurate scores of NES music for researchers, musicians and fans. The goal is to make this repertoire more accessible, analysable and playable. If there’s strong interest from the broader gaming community, I may even launch a Kickstarter to expand its scope and reach.

In addition to this work, I was lucky enough to receive a fellowship from the Strong Museum of Play to study even earlier game music, with an initial focus on the Atari 2600. That project explores the origins of video game music more broadly – how early programmers and designers first began to conceptualize music as part of the gaming experience, often working under even stricter technological constraints than those faced by NES composers.

I’m also in talks with a publisher about a book devoted to music in *The Legend of Zelda*, but I can’t say too much more on that front since the details have yet to be finalized.

Oh, and I should probably use this opportunity to plug another recent book, published in February of this year, Keiji Inafune (Bloomsbury 2025), on the controversial game designer.



*Analyzing NES Music:
Harmony, Form, and the Art of
Technological Constraint*
By Andrew Schartmann