BRITAIN'S FAVOURITE CLASSIC COMPUTING MAGAZINE

PIXEL ADDICT

£6.99 ■ 2025 ■ ISSUE 28

CHIPTUNES TO CINEMATICS

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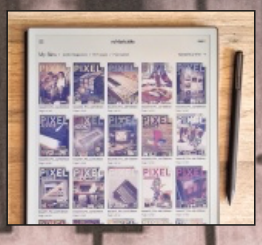

ISSN 2754-9283
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CHIPTUNES TO CINEMATICS

By James Hannigan

- The evolving role of the game composer

Award- winning, multi-industry composer James Hannigan – whose game credits include some entries in the *Command & Conquer, Theme Park, Dead Space, RuneScape, Space Hulk, EA Sports, Warhammer*, and *Harry Potter* series – explores how the role of game composers has evolved through the decades. Reflecting on his own experiences, as well as the influence of corporate dominance and cultural/ technological convergence across entertainment, he argues that the resurgence of indie gaming – much like film in the 1970s – may have brought the medium full circle, rekindling the creative spirit of its earliest "bedroom coding" days.

From loud, coin-hungry arcade machines and the endearingly lo-fi melodies of early 8-bit home computers, through to the expressive sounds of the 16-bit era and the days of sampling, streaming and studio recording, decades of technological and aesthetic change have consistently reshaped the way music is made for games. These shifts haven't always been easy – composers have constantly had to adapt to new tools, formats and expectations - but they've also created opportunities and widened creative horizons. In this article, I'd like to take a look at some of these, but first - a very brief history.

A Rapid Rewind Of Game Music

Some might argue that the journey of video game music began in earnest in 1978 with arcade classics such as Taito's *Space Invaders*. Its menacing, descending four-note motif was momentous in the evolution of commercial game sound, perhaps even introducing the notion of adaptive music.

Earlier games, such as Atari's *Pong* (1972) and *Breakout* (1976), had sound, but *Space Invaders* demonstrated how even simple music - deployed meaningfully - could be used to elevate gameplay and deepen immersion. As the number of on-screen enemies dwindled, the music's tempo increased, building tension and creating a palpable sense of urgency - a simple yet effective dynamic that continues to inspire today.

Interestingly, this may have been a happy accident: Designer Tomohiro Nishikado is on record as having said that this gradual accelerando was a by-product of hardware limitations, and he chose to retain the effect. Regardless, *Space Invaders* and its treatment of sound became iconic and influential.

Chipping In: When Sound Met Code

By the late 1970s and early 80s, arcade developers were finding the limited audio capabilities of early systems inadequate for their needs. The industry began looking for integrated, off-the-shelf solutions that could deliver audio matching the increasing complexity of gameplay and visuals - a search leading to the invention of programmable sound generators (PSGs) and frequency modulation (FM) synthesis chips.

These miraculous chips would become game-changers, offering developers unprecedented control over sound. By allowing for the creation of engaging, layered arrangements and multi-channel effects, sound chips would shape audio in gaming for a generation, while making arcades some of the *loudest places on Earth*.

While there are far too many chips and systems to list, a few examples include:

Atari's TIA (Television Interface Adapter) chip brought distinctive two-channel sound into the home via the Atari VCS/ 2600 - the first truly successful Western console to popularise cartridge-based games. While not exactly a dedicated sound chip, more a combined video and audio output controller, the TIA nonetheless represented a step forward in game audio. For my brother and I however, it was the soundtrack of Christmas 1981, etching the sound of *Tank Pong's* ricocheting bullets into our brains forever.

General Instrument's three-channel AY-3-8910, one of the earliest PSGs, found itself deployed in popular arcade games such as *Scramble*, while its AY-3-8912 variant would be used in home computer favourites including the ZX Spectrum 128 and Amstrad CPC range. Similarly, Texas Instruments' SN76489, another early three-channel chip, powered audio for arcade classics such as *Zaxxon* and *Super Zaxxon*, along with the Sega Master System. Trading laser blasts for posh educational beeps, the SN76489 would also find use in the extremely sensible BBC Micro.

Notably, Yamaha's YM2151 made a huge splash - or one might say a "Magical Sound Shower" - in the arcades of the 1980s, revolutionising music in games such as *OutRun*, *After Burner* and *Marble Madness*. An eight-channel, four-operator FM chip, commonly paired

Outrun's soundtrack is full of memorable tracks including Magical Sound Shower.

Monty On the Run is still seen as one of Rob Hubbard's best.

The Last Ninja soundtrack has been a popular choice in various live shows from the likes of Back In Time.

with the SegaPCM - capable of playing back sampled sounds - the YM2151 enabled composers like Sega's Hiroshi Kawaguchi and Atari's Brad Fuller to create complex, multi-timbral arrangements complete with rich, dense harmonies - often evoking the sounds of mainstream pop and jazz fusion. Similar FM tech, used contemporaneously in the popular Yamaha DX-7 synthesiser - a mainstay of 1980s pop music - brought the sound of game music and mainstream music production closer together than ever before.

Support for real-time modulation of parameters such as amplitude and pitch allowed composers like Kawaguchi to employ musical effects like tremolo and vibrato, further enriching the expressive qualities and dynamic range of game music. Or, as I like to think of it: gamers could now speed down a neon-lit highway at 150mph, indulging their *Miami Vice* fantasies while shredding imaginary guitars.

Back in the world of home 8-bit computing, the legendary C64 SID (MOS 6581) was fast becoming iconic. With its three-channel hybrid analogue-digital synthesiser, programmable waveforms, ADSR envelopes and filters, it outperformed most similarly priced systems of its day and, alongside its pantheon of star composers, kicked off an era of astonishing technical innovation and creativity. Pushing the boundaries of sound chip capability and, some would say, defining the core sound of Western game music during the 1980s, the SID and its proponents ignited a long-lasting fascination with game soundtracks. More importantly, it gave parents the world over a new excuse to shout, *"Turn that thing down!"*

8-Bit Bards: Legends Of Chiptune

With its quirks, rising stars and, some might say, slightly subversive subculture, 8-bit gaming and chip music thrived for at least a decade, seeming to operate by its own rules. For many young gamers like me, game music during this period felt as though it existed in some kind of parallel universe, magically performed live within machines as we played. As Mr Spock might have said of it, with a raised eyebrow: "It's music, Jim, *but not as we know it…"*

Early game music quickly evolved a distinctive sound and cultural identity all of its own, serving not only as accompaniment but as a sonic extension, woven into the gameworld. There was, I've always felt, a sense in which this music was cut from the same cloth as the rest of the game - happening right now, rendered by onboard hardware. Perhaps it was this marriage of technology and artistry that made it extra special - much in the way symphonic music can become intrinsically tied to the orchestra performing it.

Composers such as Rob Hubbard (*Monty on the Run, Thing on a Spring, Sanxion*); Martin Galway (*Wizball, Rambo, Comic Bakery*); Jeroen Tel (*RoboCop 3, Cybernoid, Hawkeye*), who, together with Charles Deenen, founded the Maniacs of Noise collective; Tim Follin (*Ghouls 'n Ghosts, Bionic Commando*), often collaborating with his late brother Geoff; and the late Ben Daglish (*The Last Ninja* - co-composed with Anthony Lees, *Trap, Deflektor*) quickly found themselves at the cutting edge of the C64 music revolution.

Rob Hubbard popularised, among other techniques, the use of rapid arpeggios to simulate chords: By cycling through notes in quick succession, a psychoacoustic effect of sorts could be achieved, fooling listeners into perceiving a full chord - thus appearing to transcend the limitations of the three-channel SID. *Monty on the Run* demonstrates this beautifully.

Between 1988 and 2002, Hubbard made the move from freelance composer to in-house at EA in the USA, where he helped to shape audio for a new generation of interactive entertainment.

Martin Galway excelled in his use of vibrato and pitch bending, bringing a lyrical and atmospheric quality to his music rarely encountered in Western games of the era. His lilting themes for *Green Beret* and *Rambo* showcased this wonderfully: Using soft tones, swells and subtle pitch modulation, Galway injected musicality and drama even into loading screens, setting an ominous tone and hinting at a narrative depth atypical of game music in its day - perhaps even echoing the emotions of Rambo himself.

The efforts of these composers - and numerous others whom I sadly can't squeeze in here - cemented their places in computer gaming history, contributing to the birth of a genre that happily lives on to this day: chiptune.

It's often said that constraints are a catalyst for creativity, and chip music is clearly no exception - much of it had to be coded directly into the hardware. As a youngster, like many of my friends, I found myself captivated not only by the works on offer, but by the sheer ingenuity required to create any of it at all. As we looked forward to each new game release, I can recall us eagerly anticipating the music as well: *What would Rob Hubbard do next?*

As a brief aside, while 1980s chip music was confined to the limitations of its hardware, figures such as arranger, producer and all-round sound chip expert Chris Abbott have, in subsequent years, played a role in reviving and reimagining these iconic

Amiga Format gave away the excellent Music-X on a coverdisk.

sounds - through projects like the "Back in Time" album series and live orchestral ventures such as "8-Bit Symphony."

Melodies Of The Rising Sun

Over in Japan, by the mid-1980s, Koji Kondo (*Super Mario Bros., The Legend of Zelda*) was also playing his part in elevating console game music to an art form. On systems like the Nintendo Famicom (aka the NES) - which utilised the five-channel Ricoh 2A03 processor for sound - Kondo's memorable tunes quickly became iconic at home and abroad. Strongly associated with popular Nintendo characters such as Mario and Link, his works seamlessly integrated with gameplay, vividly describing environments ranging from Mario's cheerful, sunny landscapes to the eerie atmosphere of haunted houses. His work - among that of others of the time, on a multitude of console systems - helped elevate game music from mere catchy tunes to an essential storytelling tool.

Kondo's music became an active participant, reflecting changes in the gameworld, punctuating key moments and actions. Often used to reward, challenge, or even punish players - music reinforced a sense of accomplishment or comedically highlighted failure. At times echoing the "Mickey Mousing" technique pioneered in early Disney cartoons, falling flat on your face has never sounded so delightful - or as musical.

From Chiptunes To Trackers

After the arrival of the Amiga in 1985 - with its affectionately named Paula chip and four-channel PCM sampling capability - computer game audio took a leap into the realm of full-blown sample-based playback. Sampling was reshaping pop music in general during the period, seeing game composers increasingly ride the same creative currents surging through the broader entertainment community.

During the late 1980s and early 1990s, tools such as *Soundtracker* emerged, ushering in the innovative Tracker era. These accessible apps allowed both established composers and hobbyists to create music in the form of MODs, using tiny snippets of digital audio - often synchronised with stunning visuals showcasing the Amiga's impressive capabilities. Pushing the hardware to its limits, a subculture of coders, artists and musicians effectively introduced yet another multimedia art form to the world: the demo scene. Many would later transition into the games industry.

Just seeing this screenshot makes me want to hum the tune.

Composers such as Chris Hülsbeck (*Turrican*), David Whittaker (*Shadow of the Beast*), Allister Brimble (*Alien Breed*) and Barry Leitch (*Lotus Turbo Challenge 2*) exploited the era's hardware beautifully to craft high-octane soundtracks defining the Amiga's sonic identity. Notably, BAFTA winning composer Jesper Kyd (*Hitman, Assassin's Creed*) also cut his teeth with the Amiga and C64.

MIDI and Soundcards

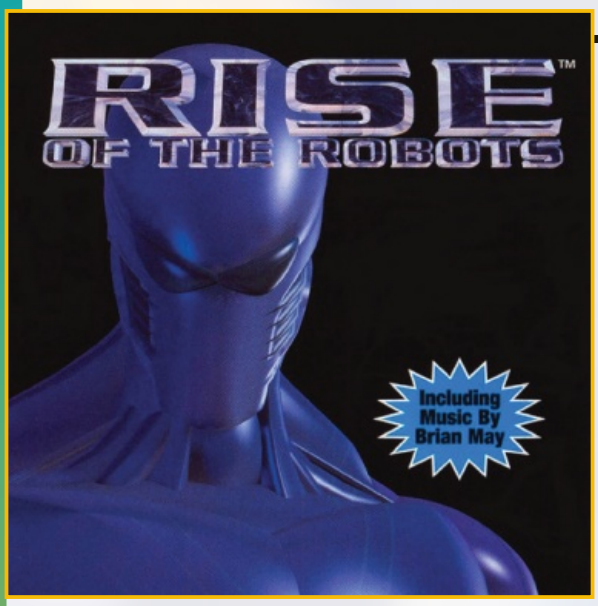
Before long, software-based MIDI sequencers such as *Music-X* on the Amiga (my own first music package), *Pro 24* on the Atari ST, and early iterations of *Cubase* on several platforms - began springing up, allowing users to hook their machines up to keyboards and professional synths. These programs - adopted by the wider music community - would make inroads into the hobbyist market, further bridging between home computing and professional production.

The simplicity of the MIDI sequencer's popular *piano-roll* editor proved hugely influential in music creation across all media, placing powerful compositional tools into the hands of musicians who had hitherto been denied access to expensive recording studios. Even those who couldn't read music found a path into production by 'playing' or 'drawing' in their ideas directly using keyboards and controllers.

For the PC, the arrival of soundcards like AdLib and Sound Blaster and Roland's LAPC-I brought new music-making possibilities. Each allowed real-time playback and manipulation of MIDI data - effectively interactive music, where scores could adapt on the fly to in-game events. This led to the desire for a common instrument set across all soundcards and therefore a growing acceptance of the General MIDI (GM) standard.

Early 1990s releases such as *The 7th Guest* and *DOOM* - with music by George Sanger (aka The Fatman) and Bobby Prince respectively - demonstrated how composers could harness relatively simple instrument banks to create anything from eerie atmospheres to head-banging metal riffs.

The Commodore Amiga would open up a world of new possibilities for musicians.



Several games would use well known rockstars such as Brian May and Rick Wakeman

PCs and soundcards, however, by virtue of their modular nature and wildly varied specs, presented challenges when it came to finding a "one size fits all" approach to playback: getting a consistent sound across the sprawling hardware landscape could feel like teaching a room full of stray cats to meow in perfect harmony.

Attempts at standardisation were less fraught with difficulty on systems like the Atari ST, Amiga and across gaming consoles, complicating the lives of audio types who found themselves working with multiple formats. Numerous technologies vied for supremacy, with no single model to rule them all. Standardisation wouldn't emerge for some time and, in many ways, has only really done so within the last 10 to 15 years.

Nevertheless, by the mid-1990s, sampling, MIDI and increasingly capable microcomputers had changed the rules of game audio forever, putting music production on a path that would soon - for better or for worse, depending on your view - merge seamlessly with the tools and methods of mainstream film and TV scoring.

The Professionalisation Of The Game Composer and Sound Designer

By the 1990s, it wasn't unusual for developers to employ an individual overseeing everything from content creation to implementation. For several years, this combined role made pragmatic sense: such generalists had direct access to hardware, uniquely positioning them to tackle everything at once.

A Jack-of-all-trades role perhaps, but this combining of roles - coupled with the shared sonic and musical palette of hardware chips - had encouraged such figures to think of audio holistically rather than as comprising of several separate disciplines. As a result, early game audio often reflected a single vision from inception through to playback.

Red Book & Roll: When CDs and Streaming Took Centre Stage

With the advent of streaming, the in-house model began to shift a little. The use of pre-recorded, "baked" music, and the option to record and tracklay sound effects, quickly brought mainstream entertainment industry tools into the world of game audio.

Over time, gaming hardware's distinctive, built-in "recording studio" was gradually replaced by more traditional setups, leading to an inevitable exchange of skills, ideas and approaches across industries.

With corporate control becoming increasingly monolithic and Hollywood-esque, MIDI sequencers and studio production began to dominate the scene. Hard-disk recording and software such as *Pro Tools* (already a staple in film and TV) soon found their way into games - most often to mix audio for linear cutscenes or "cinematics."

Audio creatives could now capture gameplay footage and audition sound and music for in-game scenarios before implementation. And since these tools required little technical knowledge - often no coding at all - the focus began to shift away from *how* to implement and toward *why*: design, content, emotion and function - especially in the realm of music.

These changes inevitably brought clearer delineation of roles among coders, editors, sound designers and composers: Just as in film we wouldn't expect John Williams to be particularly proficient in *Pro Tools*, or to serve as his own music editor when scoring *Star Wars*, game composers were - for better or worse - gradually being asked to focus solely on music, opening doors to anyone from the wider world to enter the industry on the basis of musical merit alone.

John Broomhall.
(Photo courtesy of Daniel Adhami)

"The mid-nineties was a very exciting period at MicroProse running a small in-house music and sound department tasked with servicing an ever-increasing number of productions - and with games moving from floppy disks to CD-ROM, there was simultaneously a massive jump in the actual amount of sound effects, speech and of course music that we could physically ship to the player.

This, combined with bigger budgets and the advent of multiple channels of digital sound and conventionally recorded music, meant the doors were opening to some fascinating new creative possibilities. For instance, previously the music creation process had been intrinsically entwined with the inscrutable hardware only accessed via esoteric, quirky, custom-programmed software tools, thereby severely limiting who could compose our game music. Now however, we could start to actively engage with outstanding freelance talent - composers brought in for their musical prowess, rather than their computer tech skills."

- John Broomhall (composer of X-Com and Transport Tycoon, and former Head of Audio at MicroProse)

The advent of Red Book CD audio fuelled this shift by allowing games to play back recorded tracks, leading to a surge in celebrity incursions during the 1990s. Rick Wakeman of Yes was one - contributing music to Psygnosis' *Microcosm* in 1993 - while Brian May of Queen famously added tracks to *Rise of the Robots* in 1994. A decade later, among other examples, film composer Danny Elfman provided the main theme for Lionhead's *Fable*.

As you might imagine, these moves began to alienate many in-house composers. While such collaborations attracted valuable media attention, the practice was - and still is - fairly atypical for the industry. Unsurprisingly, it became evident that a deep understanding of the interactive medium, coupled with close day-to-day collaboration with developers, is paramount in crafting effective game music.

In the wake of such changes, however, surviving as a game composer had become harder than ever. This widening of musical scope meant it was becoming essential to embrace new, imported methodologies - rendering some skill sets almost obsolete. As Jason Page - audio guru and contributor to the excellent *Gran Turismo* and *Rainbow Islands*, along with countless other titles, describes it:

Jason Page.

"The transition from chip or tracker music to that of CD and then streaming was a bit of a rollercoaster ride. Issues such as the lack of seamless looping or any kind of interactive music ability meant that CD-DA was actually quite a big step backwards in terms of how game music was expected to work. This resulted in a number of games where there would be an obvious divide between where both CD music and chip music were used, which didn't always work as a single coherent experience. To me, that sums up my feelings of this transitional period."

Adapting to these changes involved not only the move over to using a DAW and hardware modules (this was just prior to VST plugins being on the radar), and becoming sufficient at mixing and mastering, but also understanding what the new limitations were with CD and how best to traverse them. It meant that the game audio composer offerings would be directly compared to that of great musicians, mixers and mastering engineers - or whoever the latest band of the moment happened to be.

Streamed audio removed most of the technical limitations to that of CD and DVD streaming. No seeking latency, no looping issues, etc. At this stage, it felt a lot more like the dream audio scenario that CD only taunted us with. Game audio had grown up."

- Jason Page - Composer, Former Audio Manager at SCEE, and current Audio Director at Unity Technologies.

When Tech Calls The Shots

Emerging art forms often draw on existing ones while carving out their own identities, with technology being a huge influence on how these forms evolve. This I believe, is why the games industry began modelling itself after cinema and film within certain sectors. As Professor Stephen Deutsch, a film composer and music scholar, suggests:

"New inventions often mimic the forms available at the time of their inception. The first automobiles did look like 'horseless carriages'; the first electric light fittings resembled gaslight fixtures; our current computers are a hybrid between the typewriter and television. Similarly, the content of new technological art forms often mimics earlier forms. Early films were theatrical performances played to an unmoving camera; recordings were souvenirs of performances, trying to capture (in classical music, at least) the acoustic world of the best seat in the concert hall; and early television was radio with pictures. In most cases (classical music being an interesting exception), eventually the form begins to influence the content."

- Music for Interactive Moving Pictures

The music industry of old throws up another interesting example: the length of a 78RPM record dictated the duration of a single, and by extension, the conventional length of a pop song - a standard that largely persists today.

Likewise, the capacity of a 33RPM LP and, later, a 72-minute CD established the typical album length - another convention that largely continues to hold, even in the streaming era, when no such time constraint actually exists.

If technology can determine content, then it stands to reason that whoever controls an industry's technology, its platforms and distribution, also gets to set its conventions - going some way towards explaining how large gaming corporations have been able to steer the creative agenda for decades.

By the same token, smaller studios and indie developers - whether from the bedroom coding era or the present-day

Contributing to Flight of the Amazon Queen was one of James' earliest jobs.

- in theory can enjoy greater freedom to experiment, less bound by mega budgets and commercial imperatives. It's a no-brainer, isn't it?

My Personal Journey Into Games

With an array of shiny new audio toys at their disposal, game audio departments increasingly began borrowing from other media forms - and with such tools came certain aesthetic sensibilities, accelerating a broader cultural convergence across all of entertainment.

James pictured in EA's offices in 1995.

It was against this background in the early to mid-1990s that I slowly found my own way into games. My plan had been to work in film, but a lifelong love of games - and the forces of convergence - drew me in. At the time, terms like "interactive movie" and "cinematic game" were being thrown around so freely that I felt I might have something to offer. While at university and working as a freelance composer in TV and library music - armed with nothing but cassette tapes - I began sending demos to developers and established game composers.

Entering The Fray

My first invitation came from the late Richard Joseph - composer of *James Pond, The Chaos Engine* and *Cannon Fodder* (with regular collaborator and all-round industry legend, Jon Hare) - who offered me freelance gigs contributing music to titles such as *Flight of the Amazon Queen*. I soon found myself composing for other projects here and there - including *Cutthroat Island* for Software Creations and *Warhammer: Shadow of the Horned Rat* for Mark Knight (another fantastic industry composer, still very active today), then based at Mindscape.

Space Hulk - it's enough to make you chant in Latin!

Before long, I crossed paths with John Broomhall, then at MicroProse - sparking off a decades-long friendship that would eventually see us co-found the Game Music Connect conference series in London decades later. John curates the audio programme for DEVELOP in Brighton and is highly regarded within the game audio community as both a creative and commentator - yet, despite our long-standing friendship, our only shared project remains Geoff Crammond's *Grand Prix 4*.

In-House At EA

Around 1994, I took the position of in-house composer at Electronic Arts Europe, within their recently built Berkshire-based dev studio. The impressive facility boasted a new, custom-built recording studio - rare for the industry at the time - put together for music production, voiceovers and general recording across internal and external EA projects.

It's a blur now, but I can still recall voiceover sessions unfolding there - including ones with legendary commentator John Motson for early *FIFA* titles, as well as for various games on the Bullfrog and Origin label.

Alongside early team members Chris Nicholls and the late Bill Lusty, my role at EA was to compose music for some of the projects passing through, which included titles such as *Space Hulk: Vengeance of the Blood Angels, Privateer 2: The Darkening,* the lesser-known isometric god-game *Beasts and Bumpkins*, and several EA Sports titles.

(Regarding *Space Hulk*: I'm still not sure if nearby Eton College has forgiven us for the menacing Latin lyrics we asked their choirboy to sing for the PlayStation version…)

After a while, it became clear to the team that a dedicated audio coder was needed to better integrate content into EA UK's games, and to tackle the implementation of interactive music. The brilliant audio programmer, and musician in his own right, Nick Laviers - recently out of Keele University's Electronic Music and Computer Science Programme - soon joined the team.

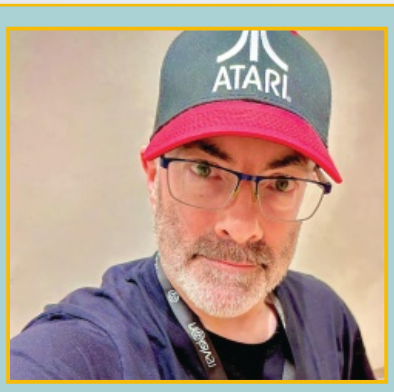
Nick and I would go on to collaborate on many projects over the next decade or so - including *Command & Conquer: Red Alert 3, Dead Space 3* and others. He's now with Respawn in Los Angeles, serving as music director on titles such as *Star Wars Jedi: Fallen Order* and *Survivor* - and it was he, along with then EA Audio Director Adele Cutting - another leading figure in game audio - who brought me on board series such as *Harry Potter*.

A Word On Licensed Music

By the mid-1990s, major publishers such as EA and Sony ramped up their use of licensed commercial music in sports and racing titles, aiming to capture stronger pop culture and mainstream appeal.

Sony's *WipEout* series (developed by Psygnosis) took licensed music to new heights starting in 1995, utilising cutting-edge electronica by artists including The Chemical Brothers,

Leftfield, The Prodigy and in-house composer Tim Wright (aka CoLD SToRAGE) - an approach perfectly matching the futuristic, adrenaline-fuelled vibe of the anti-grav racer.



Tim Wright, aka CoLD SToRAGE.

"Back in the early days, game musicians would copy well-known commercial tunes without any real issues. That said, when I innocently covered "Forest Green" in the game Lemmings for the Amiga, it resulted in a costly settlement for Psygnosis due to the work still being in copyright. Looking for [the] inception of legitimate licensing, maybe it was Midway's 1983 arcade game Journey featuring licensed music and the band's likeness? As an in-house musician at Psygnosis, I was randomly assigned to WipEout. I was tasked with developing the whole soundscape, including effects and music, as I was initially unaware of any licensing in the offing. After some licensed tracks were confirmed, Nick Burcombe, the game's designer, suggested I adopt a musical moniker. I eventually chose "CoLD SToRAGE" to fit in with other cool band names… but after I started to get fan mail, and people began to ask who was CoLD SToRAGE and where could they find more of their music, I decided to embrace the name fully."

- Tim Wright

With relatively minimal use of music elsewhere, Rockstar's *Grand Theft Auto* franchise would later find an ingenious in-game device for its licensed tracklists: fictional in-car radio stations.
EA Sports - guided expertly since the early 2000s by music industry veteran Steve Schnur - continued to bring a wide variety of artists into *FIFA* (now *EA Sports FC*) and series like *Need for Speed* and *Madden NFL*. The *FIFA* series in particular became a hitmaker and often champions new talent - something now

One of the greatest game soundtracks. The dance artists featured would help hammer home the cool factor for PlayStation.

GTA Vice City took licensed music to a new level. Having themed radio stations was a genius move and also led to audio albums you could buy.

woven into the brand's identity. In earlier years too, tracks including Blur's "Song 2" (*FIFA: Road to World Cup 98*) and Fatboy Slim's "The Rockafeller Skank" (*FIFA 99*) had enjoyed great success.

From Silver Screen To Start Screen

Licensed music doesn't begin and end with chart hits; it can also play a key role in film tie-ins. From time to time, composers are asked to incorporate or derive from well-known themes to preserve a licensed property's identity and to maintain a cohesive sound. Very early examples include 1982s *Tron* arcade release from Bally Midway, which referred to Wendy Carlos's score and Atari's *Raiders of the Lost Ark* on the Atari 2600 featuring a simple rendition of John Williams' *Raiders March*.
Perhaps there's no better early example of this practice than in the many *Star Wars* related games, now spanning decades - including Atari's 1983 ground-breaking vector-graphics *Star Wars* coin-op, LucasArts' *Star Wars: X -Wing* (1993) and *Star Wars: TIE Fighter* (1994).

For Atari *Star Wars*, musician and engineer Earl Vickers accomplished the impressive task of recreating John Williams' iconic Star Wars theme using Atari's POKEY (Pot Keyboard Integrated Circuit) chips - no small feat. For X-Wing and TIE Fighter meanwhile, Lucasart's in-house music team adapted Williams' scores for various PC sound cards, resulting in a notably authentic Star Wars musical experience.

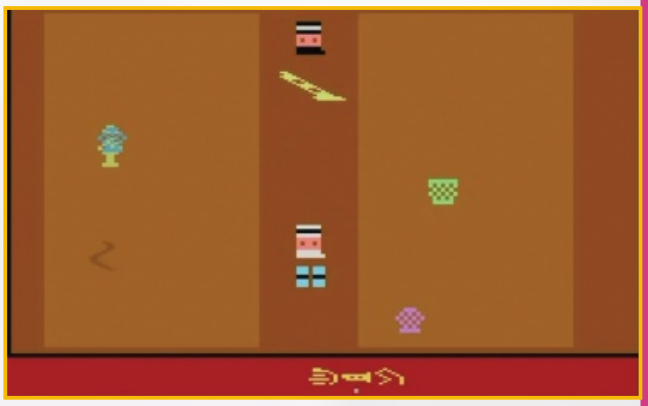
Much later, for a handful of *Harry Potter* games, even I've found myself in similar territory, weaving *Hedwig's Theme* - the main motif from the *Harry Potter* films - into some of my own game cues. This proved both challenging and rewarding, if a little scary, as such licenses don't come cheap.

Moving On

My few years in-house at EA were a short, intense crash course in how a major publisher operates - observing the politics, the pipelines and the pressure placed on dev teams. By 1997, I had returned to freelance work, teaming up again with Richard Joseph at Pinewood Studios, west of London. Working from Pinewood was another kind of education: I continued collaborating with EA/Bullfrog on titles such as *Theme Park World*, *Theme Park Inc.*, *F1* and *Catwoman* - and also dabbled in sound design for films such as *Lost in Space*. I'd later get involved in music for other media, including TV and audio drama - from *Primeval* to *Discworld*, *The Sandman* and *Alien* adaptations.

A Pivotal Road Trip

After taking the risk of leaving EA, in 1998 I rolled the dice on a USA road trip, hoping to drum up work and forge a new freelance career. My first stop



Raiders of the Lost Ark on Atari 2600 may not look like much but at least the music is recognisable..

Working on 1998's Lost In Space was one of James' early non-game roles.

was meeting C64 legend Martin Galway - then audio director at Digital Anvil, a new studio in Texas co-founded by Chris Roberts - before zooming across Los Angeles in a rented Mustang (an unforgettable experience) to knock on doors at Activision, Interplay and a few others.

Martin and I hit it off over a steak in downtown Austin, our shared love of film scores and cinema providing common ground. Having helped shape audio for numerous titles during and well beyond the C64 era - including some of Origin's *Wing Commander* series - Martin was deeply invested in cinematic sound. At the time, live-action and full-motion video in games, featuring actors like Christopher Walken (*Privateer 2*) and Mark Hamill (*Wing Commander IV*), were still very much in vogue. Upon returning to the UK, I was contracted to compose for the space RTS *Conquest: Frontier Wars*, followed shortly after by the aptly titled *Freelancer* - a highly anticipated project eventually published by Microsoft.

Alongside the *Wing Commander* series (scored by composers including George Sanger and George Oldziey) and *Starlancer* (music by Ian Livingstone), *Freelancer* would in no small part inspire *Star Citizen* years later.

Spreading my wings a little, I took on projects with several diverse developers and publishers - from Ubisoft (*Cloudy with a Chance of Meatballs*) and Frontier Developments (*Infestation*) to Elixir Studios (*Republic: The Revolution, Evil Genius*), Kuju (*Reign of Fire, Nintendo's Art Academy*) and much later, Jagex (*RuneScape*'s orchestral score, among others.)

Weirdly, I remember feeling particularly gratified to discover some of *Art Academy's* music had ended up within the *Super Smash Bros.* series - a bit of a bucket list moment for me. And during this particularly active period, I picked up five BAFTA nominations for Original Music - going some way towards validating the risky leap I'd taken in leaving EA. But managing a freelance career is *never* plain sailing.

Friend and colleague Richard Jacques (*Sonic R, Headhunter, Guardians of the Galaxy*), took a similar path into freelance work around the same time, leaving his in-house role at Sega in London. Reflecting on the precariousness of this transition, he recently told me:

> *"I was fortunate to have a fantastic start to my career as an in-house composer with SEGA Europe from 1994-2001, working on many of Sega's well known IPs such as Sonic, Daytona, Shinobi, amongst many others. One of the most exciting times was the Dreamcast era, working on titles such as Metropolis Street Racer and contributing tracks to Jet Set Radio and Jet Set Radio Future. In 2001, Sega were making some structural changes to the business, and I had long thought about becoming freelance by the time I turned 30, simply because I wanted to work on other projects with other companies and to continue to explore my own musical journey and styles.*
>
> *Following the release of Headhunter I thought that this would be the optimal time to pursue a freelance career... I was fortunate that a lot of people in the industry already knew me and my music, and indeed many of my friends and colleagues were working at various different companies, so I already had an established network. Although leaving full time employment felt a bit daunting at the time, it was definitely the right decision and I literally haven't stopped working since"*
>
> **- Richard Jacques**

Richard Jacques.

Electronic Arts UK studio, 1995.

Adele Cutting from the EA audio team.

A *rare* few composers - and I literally mean RARE - such as Graeme Norgate and Grant Kirkhope (*GoldenEye*), David Wise and Eveline Novakovic (*Donkey Kong Country*), and Robin Beanland (*Sea of Thieves*) were among those who excelled as in-house composers during this period and beyond - their ongoing success showing that the in-house model can still thrive in the right circumstances. The same must also be said of Russell Shaw (*Black & White, Magic Carpet*, the *Fable* series), formerly of Bullfrog, who moved on to head audio at Lionhead between 1996 and 2016.

Marty O'Donnell - composer of the *Halo* series - also demonstrated how the dual role of in-house composer and audio director can work in a relatively modern-day setting, allowing for a unified vision of a game's audio. These examples, I feel, also serve to illustrate how crucial strong working relationships can be for composers and audio teams - perhaps paralleling director-composer partnerships in film: Steven Spielberg and John Williams, Alfred Hitchcock and Bernard Herrmann, Tim Burton and Danny Elfman - the list goes on.

When Pixels Met Strings: Orchestral Game Music Goes Mainstream

Under increasing pressure to bring game soundtracks up to cinematic standards, the 1990s onward saw a handful of industry composers around the globe, myself included, begin phasing orchestral recording into various projects. Notably, for 2001s Sega title *Headhunter*, Richard Jacques's orchestral score for the game became the first of its kind to be recorded at Abbey Road Studios.

By 1999, for my own part, I had already funded my first live orchestral sessions with various far-flung orchestras, and over the next decade or so found myself working with several top-tier orchestras and choirs at some iconic studios - among them Abbey Road, AIR Lyndhurst, and eventually Skywalker Ranch - for various entries in franchises such as *Harry Potter* and *The Lord of the Rings*, and titles like *Red Alert 3* and *Command and Conquer 4*.

My theme for *Red Alert 3* - the somewhat viral *Soviet March* - benefited considerably from a live performance, as did *C&C* regular Frank Klepacki's experimental rock-orchestra fusion of *Hell March 3*. *Red Alert 3* is one of the last games of its era to feature an entire film within it - a genre I now really miss. Cheesiness aside, how can I ever forget Tim Curry's hilarious exclamation of "spaaaaaace!"

Tim Curry is mainly known for his film roles but his acting in Red Alert 3 is legendary!

Importantly, Japanese composers such as Nobuo Uematsu - celebrated for his work on the *Final Fantasy* series (series started in 1987) - played a key role in popularising orchestral recording and soundtracks in games from the late 1990s onwards, as did American composer Jeremy Soule (*Oblivion, Skyrim*) with his scores for titles such as *Total Annihilation*.

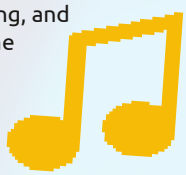
Clearly, game music isn't just about chiptunes and orchestras: figures like Akira Yamaoka, Frank Klepacki and Mick Gordon for instance, have injected blistering live guitars into *Silent Hill, Command and Conquer*, and the later *DOOM* series - further contributing to the growing success of game soundtracks. Developments such as these have helped fuel global concert series devoted to game music.

Breaking The Loop: Interactive Music

The film model has inherent limitations when applied to interactive entertainment, primarily because games can be unpredictable - unlike the passive experience of watching a movie, which features entirely pre-recorded music and a fixed timeline. Such differences in part drove the need for new techniques to manage the flow of in-game music in real-time, leading composers to begin organising - and sometimes reimagining - music for interactive playback.
Early interactive music systems such as LucasArts' iMUSE (Interactive Music Streaming Engine) - used in the 1990s for games like *Monkey Island 2: LeChuck's Revenge* (music by Michael Land, Peter McConnell and Clint Bajakian) and *Sam & Max Hit the Road* - exemplified a smooth, MIDI-based approach to handling musical flow in games. Yet, no universal or standardised method existed across the industry at the time, leading some developers to build proprietary systems from scratch. Many didn't have the resources to do so, and I dare say some simply didn't care - you can blame incessant looping on them!

After leaving EA, I first got to explore interactive music with *Theme Park World*. The game's music grew or shrank in density in real-time according to the park's popularity - branching between short, four to eight bar segments. Although simple in essence, this felt like magic at the time.

Joining Demis Hassabis's new venture, Elixir Studios, gave me an opportunity to push interactive music further. Demis - who co-designed *Theme Park* and had worked at both Bullfrog and Lionhead - would later become a neuroscientist, famously founding Google-owned AI firm DeepMind, winning a Nobel Prize in Chemistry in 2024. But at Elixir, his focus was firmly on gaming, and he was keen to expand the boundaries of interactive audio.



For *Republic: The Revolution* and *Evil Genius*, I proposed a system for horizontal music splicing and vertical layering of stems in real-time, which the brilliant audio coder Andy Mucho soon brought to life. Notably also by this time, Richard Joseph had decided to leave Pinewood to join Elixir as the company's audio director.

It was a dream scenario: I could test ideas in real-time using Andy's tools to trigger musical transitions in response to events in-game and changes in the game state. Looking back, much of what we were doing at Elixir in the early 2000s mirrored some of the flexibility of middleware solutions such as *Wwise*, which gives today's composers complete control over interactive scoring and integration.

One composer who has truly embraced the hybrid composer/music designer role is my friend and colleague Olivier Deriviere (*Remember Me, A Plague Tale, Streets of Rage 4*). More than anyone

James won a BAFTA for his audio work in Theme Park World.

I'm aware of, Olivier has taken the concept of interactive game scoring to new heights and has become a power user of *Wwise* to implement his own music in numerous AAA and indie titles. He told me recently:

> *"For me, interactive music or now, music design, is to consider players' actions through functions rather than an (almost) passive background illustration. It means that you need to think of it as a tool for your gameplay for informing, giving feedback, rewarding etc. However, the power of music is also emotional and narrative. So, blending on one side the functions and on the other side the emotion is, to me, the best use of music to create unique experiences in games."*

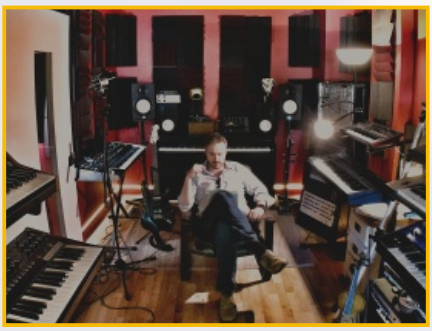
In *Streets of Rage 4*, Olivier combined the classic synth-driven sound of 1990s beat-em-ups with modern interactive tools, showing us how retro flavours and cutting-edge music design can seamlessly merge into a dynamic new game score.

Olivier Deriviere.

"Music design can vary in its complexity. For a game like Streets of Rage 4 we needed something simple. The aesthetic was based on the legacy from the previous games, to use a club music style. So, I created a DJ set that develops throughout the whole game. The unique aspect of using music design is that music follows the player's progression throughout each level. Each section of the level is supported by a specific segment of music. It's simple but players were amazed to find each scene supported by a specific moment in the music, creating memories that are still shared on social media."

- Olivier Deriviere

Olivier and the French studio Spiders invited me to score the historical, alternate-history, French Revolution - clockwork-themed game *Steelrising* in 2022, which Olivier hoped might also rekindle my interest in interactive music. I hope I didn't disappoint, Olivier is an incredibly hard act to follow.



Maybe James is pondering which keyboard to get cracking on.

To Mute Or Not To Mute: The Role Of Music In Games

In games, unlike in film, players act as both an audience and active participants, shaping outcomes within the gameworld. Whereas a flight simulator may strive for clinical realism and player control, an *Indiana Jones* game might present more of an emotional reality and an overarching story - suggesting that there's a broad spectrum at work for the role of music in games. One that calls for it to feature heavily in game design itself, with close collaboration between composers and developers ensuring coherency and shared aims; a far cry from the days of slapping music on top.

For some however, the question lingers: to mute or not to mute? Creating music that engages without irritating - particularly in repetitive games - is an art in itself. But raising the question begs another: if music is actually helpful, would players choose to turn it off? Moreover, if a game remains fully playable with its music off, then what is its purpose beyond sounding cool or setting the scene? Does it need to do any more than that?

Making music matter is a design choice. If the aim is to keep players emotionally engaged and informed, it makes sense to ensure that it adds a dimension that wouldn't exist without it.
Sad puns aside, consider the survival horror genre for a moment: sound and music is often conceived as an essential ingredient that must be heard in order to play and understand the game properly. Using subtle cues to warn players, each can signify hidden dangers, safety (as in *Resident Evil's* save-room) or convey other useful information - such as what lies behind a locked door - often in the absence of visual cues.

So, then: to mute or not to mute? Personally, I'd err on the side of caution and crank up the volume - perhaps even plug in a subwoofer to be sure.

The Rise and Fall and Rise Of The Indie Sector

In some respects, the path taken by indie games echoes the emergence of independent cinema in the 1970s. Back then, smaller studios and filmmakers took risks major studios wouldn't, experimenting with narrative structures and techniques that ultimately fed back into Hollywood. The advent of inexpensive film cameras and other equipment played a huge role in this revolution.

Likewise, the rise of middleware in game development - along with new outlets and funding models - has enabled indie developers and composers to reclaim a holistic, personal vision for games, not unlike the spirit of the bedroom coder era.

Bringing things full circle, game music appears to have returned to its roots, where individuals once shaped audio under strict hardware constraints, to a modern-day renaissance of creativity and independence led in recent years by smaller or mid-sized studios and popular composers such as Olivier Deriviere, Austin Wintory (*Journey*), Jessica Curry (*Dear Esther*), Toby Fox (*Undertale*), Lena Raine (*Celeste*) and others.

Technology can both limit and liberate game composers. Whether through experimental code-driven approaches or grand orchestral scores, the ongoing trade-off between constraints and possibilities seems to be what gives game music its soul: constantly evolving, yet unified by the shared goal of bringing virtual worlds and stories to life.

James pictured with fellow composers at Game Music Connect.