

The Cambridge Companion to Video Game Music

Video game music has been permeating popular culture for over forty years. Now, reaching billions of listeners, game music encompasses a diverse spectrum of musical materials and practices. This book provides a comprehensive, up-to-date survey of video game music by a diverse group of scholars and industry professionals. The chapters and summaries consolidate existing knowledge and present tools for readers to engage with the music in new ways. Many popular games are analyzed, including *Super Mario Galaxy*, *Bastion*, *The Last of Us*, *Kentucky Route Zero* and the *Katamari*, *Gran Turismo* and *Tales* series. Topics include chiptunes, compositional processes, localization, history and game music concerts. The book also engages with other disciplines such as psychology, music analysis, business strategy and critical theory, and will prove an equally valuable resource for readers active in the industry, composers or designers, and music students and scholars.

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Cambridge University Press
978-1-108-47302-6 — The Cambridge Companion to Video Game Music
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CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781108473026

DOI: 10.1017/9781108670289

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First published 2021

A catalogue record for this publication is available from the British Library.

ISBN 978-1-108-47302-6 Hardback

ISBN 978-1-108-46089-7 Paperback

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Cambridge University Press

978-1-108-47302-6 — The Cambridge Companion to Video Game Music

Edited by Melanie Fritsch , Tim Summers

Frontmatter

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Preface

The editors are very grateful to Kate Brett, Commissioning Editor for Music at Cambridge University Press for her enthusiasm and support for the volume, along with her Assistant Editor Eilidh Burrett. Kate and Eilidh both provided encouragement and wisdom throughout the process of creating this volume.

We would like to thank our colleagues of the Ludomusicology Research Group, Mark Sweeney and Michiel Kamp, as well as the members of the Society for the Study of Sound and Music in Games. Their efforts have helped to create the academic community surrounding music in games, whose collaborative spirit has given rise to many of the ideas and findings shared in this book. We would similarly like to thank all of our authors for their generosity in writing contributions for this book.

Unlike most Cambridge Companions, this book deals primarily with music by living composers and artists. During the book's creation, some of the musicians whose music is discussed by the authors in this volume have been reported as making offensive statements and engaging in personal misconduct. The chosen case studies and examples are in no way an endorsement of the non-musical views of any of the creators mentioned here, nor should they be understood as commenting on the personal behaviour of individuals. We also respect the difficulty of separating art from the artist.

Game music research is a young field, and we hope that the knowledge gathered here from practitioners and researchers representing a diverse set of backgrounds will inspire readers' own explorations. As the field continues to grow, we hope to continue to welcome even more views and perspectives on this exciting music that reaches so many ears.

A Landmark Timeline of Video Game Music

This timeline presents a number of landmarks in the history of video game music. To avoid presenting a history that is inappropriately linear or giving a false impression of completeness, we have selected landmark moments that reveal the changing forms and technologies of game music, as well as game music's relationship with wider culture.

Year	Landmark		Contemporary technology and world events
1972	<i>Pong</i> (Atari)	Pitched sound is introduced into video games, with different notes linked to gameplay events.	The last mission of the Apollo space programme lands on the moon.
1975	<i>Western Gun/Gun Fight</i> (Taito/ <i>Midway/Nutting</i>)	Games begin to use distinctive melodies in the mid-1970s. This early example includes an excerpt of Chopin's 'Funeral March', when a character is killed.	The Altair 8800 is released in January, sparking the microcomputer revolution as the first commercially successful home computer.
1978	<i>Space Invaders</i> (Taito)	In likely the first example of continuous music reacting to the gameplay, the four-note ostinato in <i>Space Invaders</i> increases in tempo as the aliens advance.	The Camp David Accords are signed between Israel and Egypt.
1978	Yellow Magic Orchestra release an album of the same name	Yellow Magic Orchestra's first LP includes chip music, illustrating an early convergence between pop music and games. The single release 'Computer Game' subsequently influences early hip-hop and techno musicians in the USA.	
1979	'Space Invaders' song by Player (1) released	Using audio from <i>Space Invaders</i> and a bassline influenced by the game, this song becomes	Islamic revolution in Iran.

(cont.)

Year	Landmark		Contemporary technology and world events
1981	<i>Frogger</i> (Konami/Sega)	the inspiration for one of the first house records, 'On and On' by Jesse Saunders (1984). <i>Frogger</i> is one of the earliest examples of a game where different pieces of music are cued depending on the game action.	First launch of NASA's space shuttle.
1981	'Pac-Man Fever' single by Buckner & Garcia	This novelty hit about <i>Pac-Man</i> finds chart success and is followed by a game-themed concept album of the same name in 1982.	
1982	Adoption of the MIDI 1.0 standard	MIDI establishes a standard way of communicating musical performance data. MIDI captures the instructions for performance, rather than the sonic output.	The Falklands Conflict erupts between the UK and Argentina.
1982	MOS 6581 SID chip is used as the sound chip for the Commodore 64	Designed by Robert Yannes, the SID chip offers composers great flexibility. Though it only features three main voices, composers can select waveforms for the channels and each has a wide pitch range. Beyond the Commodore, the SID chip in its several iterations and variations inspires musicians and becomes an important feature of the chip-tune scene.	
1983	<i>Journey</i> (Bally/Midway)	This arcade game, starring the band of the same name, features synthesized versions of Journey's music during the game. In the final level, an audio cassette built into the cabinet plays a looped, edited recording of Journey's 'Separate Ways'. This is not the first video game appearance of Journey: it is a successor to an earlier home console Journey game.	The first commercial mobile telephone call is made.
1983	<i>Moon dust</i> (Creative/Lanier)	One of the first so-called 'art games', created by Jaron Lanier for the Commodore 64,	

(cont.)

Year	Landmark		Contemporary technology and world events
		features generative music in an ambient style as a core part of the game's aesthetic.	
1984	<i>Ballblazer</i> (LucasArts)	In contrast to <i>Moon dust</i> , <i>Ballblazer</i> features an algorithmically created theme song, 'Song of the Grid' by Peter Langston, in a rock style.	Bob Geldof and Midge Ure assemble a supergroup of musicians to perform a charity single under the name Band Aid.
1984	<i>Video Game Music</i> (LP)	Haruomi Hosono assembles the first commercial album of video game music, featuring captures and remixes of sound from Namco games.	
1986	<i>Dragon Quest Symphonic Suite</i> album	An album of <i>Dragon Quest's</i> music is released, with the music arranged for orchestral performers. It marks the beginning of orchestral game music albums.	The Chernobyl nuclear power plant undergoes a catastrophic disaster.
1986	Special game music issue of the Japanese gaming magazine <i>Beep</i>	The Japanese gaming magazine <i>Beep</i> was first published in 1984. This special issue augments their audience significantly. After this issue the magazine features a regular section dedicated to game music.	
1986	<i>Soundmonitor</i>	Chris Hülsbeck releases his <i>Soundmonitor</i> , the first tracker program for users to create their own music, as a listing in the German computer magazine <i>64er</i> .	
1986	<i>OutRun</i> (Sega)	This arcade racing game by Sega is notable for several aspects, including its outstanding hardware and non-linear gameplay. It also allows players to choose the music to accompany their play. The music, composed by Hiroshi Kawaguchi, later inspires the synthwave genre called OutRun in the early 2000s,	

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Year	Landmark		Contemporary technology and world events
		named in reference to 1980 aesthetics. <i>OutRun</i> 's music is played live by the Sega Sound Team (SST) during their concerts in the late 1980s.	
1987	Dragon Quest Concert in Tokyo	Koichi Sugiyama stages a 'Family Classic Concert' at Suntory Hall, Tokyo. The concert programmes his music from <i>Dragon Quest I</i> and <i>II</i> alongside Saint-Saëns's <i>Carnival of the Animals</i> . It is likely the first orchestral concert of video game music.	A West German teenager lands a light aircraft in Moscow's Red Square.
1987	<i>Dance Aerobics</i> (Bandai/Human, Nintendo)	This release for the Famicom/NES is the first game to feature a floor mat controller, the Power Pad. It anticipates later dance games.	
1987	<i>Otocky</i> (Sedic/ASCII)	<i>Otocky</i> is a musical sidescroller shoot-'em-up game by Toshio Iwai for Nintendo's Famicom. It is notable for its generative soundtrack, co-created by the player while playing. It was never released outside Japan.	
1987	Commodore Amiga makes extensive use of the MOD music format	The Amiga uses a format for storing music which is similar to MIDI, but also includes the instrument samples in the files, as well as the note data, which creates significant possibilities for unique musical timbres.	
1988	<i>Soundtracker 2</i>	'Exterminator' of the Dutch hacker group Jungle Command hacks Karsten Obarski's <i>Soundtracker</i> , and rereleases it as freeware under his own name, making the playback routine public. It starts the soundtracker revolution, and other trackers are later built from it (like <i>NoiseTracker</i> and <i>ProTracker</i>).	The Morris Internet Worm, the first internet-spread malware, wreaks havoc.
1991	<i>Monkey Island 2: LeChuck's Revenge</i> (LucasArts)	LucasArts debut iMUSE, an interactive music system, demonstrating complex	The Cold War ends with the dissolution of the USSR.

(cont.)

Year	Landmark		Contemporary technology and world events
		adaptive music programming including branching, layering and alternative variations. It even allows music to dictate game timing.	
1991	General MIDI standard established	To combat the high degree of variation between sound cards and hardware, General MIDI presents a template of 128 instruments, so composers are able to address specific instruments in their sound files. This ensures that, for example, a part written for a violin always sounds as a violin.	
1992	<i>Streets of Rage II</i> (Sega)	<i>Streets of Rage II</i> is the second entry in Sega's side-scrolling beat-'em-up series and features a soundtrack inspired by 1990s club music, created by Yuzo Koshiro and Motohiro Kawashima.	Atari, Nintendo and Sega are all involved in lawsuits concerning reverse engineering and modification of games.
1994	Michael Jackson is engaged to write music for <i>Sonic the Hedgehog 3</i>	Video games begin to attract major pop stars to write music specifically for games. One of the world's most famous musicians is involved in <i>Sonic 3</i> . Ultimately he is uncredited in the released game. His contribution to the finished game would long be the subject of avid speculation. British band Right Said Fred promote <i>Sonic 3</i> with their song 'Wonderman'. Jackson appears in several games, including <i>Moonwalker</i> (1989) and <i>Space Channel 5</i> (1999).	Nelson Mandela becomes the first president of South Africa.
1995	<i>Wipeout</i> (Psygnosis)	<i>Wipeout</i> is released as a PlayStation launch title in Europe and features music from electronic music acts such as Orbital, The Chemical Brothers, Underworld and Leftfield. It is part of a wider	eBay and Windows 95 are launched.

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Year	Landmark		Contemporary technology and world events
1996	<i>PaRappa the Rapper</i> (NanaOn-Sha)	<p>approach of Sony to market the PlayStation to a more mature demographic than earlier games consoles.</p> <p>This rhythm-based music game is created by music producer Masaya Matsuura and Rodney Greenblat. A comic-styled dog PaRappa learns to rap from several teachers. It is a commercial success on the PlayStation in Japan and is one of the starting points of the Japanese music game boom of the late 1990s.</p>	Dolly the sheep is born, the first mammal cloned from a somatic cell.
1997	<i>The Lost World: Jurassic Park</i> (Dreamworks) (PlayStation and Saturn)	This game, with music by Michael Giacchino, is one of the first to use a recorded orchestra for the soundtrack, made feasible by the space and facilities of CD-based consoles.	Deep Blue beats Garry Kasparov in a chess match, the first computer to beat a current world champion.
1997	<i>Beatmania</i> (Konami)	The DJ-style rhythm game <i>Beatmania</i> , along with <i>PaRappa</i> , launches the Japanese game music boom. <i>Beatmania</i> lends its name to Konami's eponymous Bemani line of music games.	
1998	<i>Dance Dance Revolution</i> (Konami)	<i>Dance Dance Revolution</i> (released in Europe as <i>Dancing Stage</i>), part of Konami's Bemani series, becomes internationally successful and starts a long-running series of games. In 2012, Konami creates a special edition of the game with the American Diabetes Association, The National Foundation on Fitness, Sports, and Nutrition and the Let's Move! project for US schools' physical education classes. <i>Dance Dance Revolution</i> develops a very active fan community that engages in competitions all over the world.	Tencent and Google are founded.

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Year	Landmark		Contemporary technology and world events
2000	<i>LSDJ (Little Sound DJ)</i>	Johan Kotlinski creates tracker software to turn a Game Boy into a synthesizer, allowing direct control of the Game Boy's five hardware sound channels with a straightforward interface. It becomes a staple of the chip-tune scene.	Apocalyptic predictions of the consequences of the Millennium Bug computer date error fail to materialize.
2001	<i>Grand Theft Auto III</i> (Rockstar)	With DVD storage as a dominant format, games could now include significantly more recorded and licensed music. <i>Grand Theft Auto III</i> features pre-existing music as part of in-game radio stations, complete with announcers and fictional adverts.	The United States suffers a terrorist attack on 11 September, prompting a controversial 'War on Terror'.
2001	Release of the album <i>Music inspired by Final Fantasy: The Hollywood Symphony Orchestra and Chorus Perform The Music of Nobuo Uematsu</i>	In the 1980s and 1990s, most game music albums are only available outside Japan as expensive imports or as bootleg MP3s. In 1997, Stephen Kennedy starts the 'Project Majestic Mix', a group of game music fans who want to produce an album. Via the project's website, the group select the music and fund the project with donations from other fans. Kennedy contacts Uematsu and Square to clarify issues of copyright and licensing. He is successful and the first album is released. It is followed by three more albums of music from Square games.	
2001	<i>Rez</i> (United Game Artists)	The game <i>Rez</i> is released (in Japan in a bundle with a peripheral called the Trance Vibrator) aiming at recreating the experience of a rave.	
2001	Virtual music by In Extremo in <i>Gothic</i> (Piranha Bytes)	The German medieval rock band In Extremo appears in the fantasy game <i>Gothic</i> , performing their live rendition of 'Herr	

(cont.)

Year	Landmark		Contemporary technology and world events
		Mannelig'. For non-German language releases the performance was deleted, because of copyright issues.	
2003	Symphonic Game Music Concert in Leipzig	Opening the Leipzig Games Convention, Thomas Böcker produces the first commercial game music concert outside Japan, starting an ongoing tradition of Western concerts of game music.	The Human Genome Project is completed.
2005	<i>Guitar Hero</i> (RedOctane)	Starting a craze for rhythm music games in the West, <i>Guitar Hero</i> captures the interest of a wide audience attracted by the performative possibilities of the game.	YouTube is launched.
2008	<i>Spore</i> (Maxis)	Procedural generation is central to the 'God game' <i>Spore</i> . It features an elaborate music system that procedurally generates music on the fly, rather than playing pre-composed music. Similar examples include <i>No Man's Sky</i> (2016).	A major financial crisis affects banks and economies around the globe.
2008	Karen Collins publishes <i>Game Sound</i>	The first academic volume dedicated to video game music and sound gives the area of study new legitimacy.	
2008	'Auto-Mario Wipeout' or 'X Day' on Nico Nico Douga	On May 13th, 2008, Japanese video platform Nico Nico Douga bulk-deletes fan-made Automatic Mario videos because of copyright infringement. Automatic Mario is a specific subgenre of remix videos using customized Super Mario World levels to recreate popular songs and other music.	
2008	'Symphonic Shades' concert is broadcast live	The WDR Rundfunkorchester, conducted by Arnie Roth, perform a concert dedicated to the game music of Chris Hülsbeck: "Symphonic	

(cont.)

Year	Landmark		Contemporary technology and world events
		Shades” – Hülbeck in Concert’. This is the first game music concert to be broadcast live on radio and streamed on the internet.	
2009	<i>DJ Hero</i> (FreeStyleGames)	DJ game featuring the music of artists such as Daft Punk, DJ AM, Grandmaster Flash, DJ Jazzy Jeff, and many more, some included as avatars in the game.	The cryptocurrency Bitcoin is launched.
2011	Christopher Tin’s ‘Baba Yetu’ wins a Grammy Award	Written for <i>Civilization IV</i> (2005), and later rereleased on Tin’s 2009 studio album, ‘Baba Yetu’ becomes the first music composed for a video game to win a Grammy Award. It was nominated in the category ‘Best Instrumental Arrangement Accompanying Vocalist(s)’.	Anti-government protests spread across the Arab world, a phenomenon named the ‘Arab Spring’.
2011	<i>Rocksmith</i> (Ubisoft)	<i>Rocksmith</i> is released, featuring the option to plug in a real guitar and advertising that players can learn to play the guitar through the game.	
2011	<i>Top Score</i> , a radio show/podcast dedicated to game music begins	Emily Reese begins a long-running programme celebrating game music and interviewing composers on Classical Minnesota Public Radio.	
2012	<i>Journey</i> ’s soundtrack nominated for a Grammy award	Austin Wintory’s music for <i>Journey</i> is nominated for ‘Best Score Soundtrack for Visual Media’, the first time a game score is nominated in this category.	The Higgs boson elementary particle is discovered.
2015	<i>Undertale</i> (Toby Fox)	The rise of digital distribution and open or free development tools prompts a blossoming of independent game development. In seeking a different approach to high-budget releases from major studios,	The Paris Agreement on climate change is negotiated at a United Nations climate conference.

(cont.)

Year	Landmark		Contemporary technology and world events
		many such games embrace retro or nostalgic aesthetics (both generally and musically). <i>Undertale</i> is one such example, modelled visually, sonically and ludically on RPGs of the 1980s.	
2018	AR K-pop live concert opens the <i>League of Legends</i> World Championships	As e-sports tournaments come to more closely emulate traditional sporting events, Riot Games opens its annual <i>League of Legends</i> World Championships with a spectacular show including an augmented reality performance by K-pop group K/DA.	According to the UN, more than half of the world's population is now using the internet.
2020	<i>Journal of Sound and Music in Games</i> published	An academic journal dedicated to the study of music and games is launched by the Society for the Study of Sound and Music in Games.	The world experiences a global pandemic of the Covid-19 virus.
2020	Travis Scott stages a concert in <i>Fortnite</i>	12.3 million players attend a virtual concert in a game. Though online games have been hosting performances since the mid-2000s, this event brought new attention to the format.	

Cambridge University Press

978-1-108-47302-6 — The Cambridge Companion to Video Game Music

Edited by Melanie Fritsch , Tim Summers

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Foreword: The Collaborative Art of Game Music

LYDIA ANDREW

I greatly welcome the opportunity to write this foreword to *The Cambridge Companion to Video Game Music*. The essays in this collection share ideas about this dynamic, shape-shifting, all-embracing discipline from multiple perspectives. That sharing is a communal, creative effort. In many ways, it is what video games themselves are all about.

Music is a key moment where the creative vision of player experience crystallizes. Whatever the genre of game, music can characterize avatars, it can enhance settings, it can deepen emotions and shape the pace of games.

Game music is an experience. It is not linear. Every change comes from a hook in gameplay, a decision of programming, a variation in the system based on the player's input. To create a consistent player experience, both diegetic and non-diegetic music, and the role of music within the larger soundscape, demand a through line deeply grounded in our response and engagement with the game. Research, creative expression and the ongoing search for ways to connect with our players: all are synergistic and raise issues of identity and psychology. One of the great, continuing pleasures of developing and playing video games is that this work is never done. This is what has most inspired me in my work on the *Assassin's Creed* brand, specifically *Syndicate* (2015) and *Odyssey* (2018).

Game music is a truly collaborative creative endeavour, which draws deeply on a range of people's skills. The music team works with world designers, animators, game designers, gameplay programmers and audio programmers, without speaking of the composers, musicians, arrangers, lyricists, researchers and the rest of the audio team (dialogue and sound effects) with whom they must liaise. The larger the scale of the game, the greater the challenges to consistency in the game architecture into which we all feed. But on smaller games too, the ultimate design of music is determined by the particular player experience a team collectively foresees. It is an emotional and creative vision that must first be defined.

For my part, that collaborative process begins with our early concept art, narrative outlines and gameplay ideas. These provide touchstones to discuss with the rest of the development team – the evocations, moods

and themes that are the building-blocks of our living and breathing world. These in turn suggest paths of ever-deepening research.

For both *Syndicate* and *Odyssey*, we wanted a holistic design of music. We wanted diegetic and non-diegetic music to be symbiotic. Music speaks constantly of shared community – it is born of art and architecture, of commerce, beliefs, logistics, wider cultural life, even the weather of its locale. For *Syndicate*, that locale was mid-Victorian London, engine of innovation and modernity, and of the great social and psychological disruptions that go with them. A Londoner myself, I needed to hear experimentation, immediacy, aggression and something of that psychic dislocation in the style. Austin Wintory tuned into this. Aided by critical musicologist Prof. Derek Scott and traditional music producer Dave Gossage, we curated a selection of songs which captured the atmosphere of each district of London. For instance, light opera, military music and hymns for Westminster; pub singalongs and folk music for Whitechapel. From each selection, we further chose one song as the key motif for that district. Westminster became ‘Abide with Me’, and Whitechapel became ‘My Name It Is Sam Hall’. Austin wove these motifs into the underbelly of the score, such that each melody echoes subtly throughout its district. Score and source fully intertwined.

Against this use of popular music for atmosphere, we used commissioned ballads to deepen the drama of the game story itself. The game’s progression demands critical assassinations, so the band Tripod in Australia and Austin wrote original murder ballads, attuned to the personality of each victim, modelling them on popular Victorian storytelling songs. The intimate dance of death further informed the score – we hear small chamber ensembles, solo string instruments attached to characters, the light ‘springiness’ of waltzes and mazurkas, the immediacy of scherzo sketches.

For *Odyssey*, the world was larger and more complex.

The commissioned score took over two years to develop. The musical duo The Flight are multi-instrumentalists and producers as well as composers. We had to discover Ancient Greece together. Consequently, the research effort demanded was great. Little music survives from the Golden Age of Ancient Greece. We looked at ancient vases and sculptures for visual clues, and to ancient texts for lyrics and poetry. We wanted an intimate, handmade, acoustic feel. We found one sonic signature in the Aulos, a key instrument in ceremonies and festivals, reconstructed from archaeological findings. In exploring how this instrument was played, we came to appreciate its relevance to a modern audience. To do this, we

combined voices and other instruments in such a way as to appeal to modern musical aesthetics and used this instrument at significant moments in our non-diegetic underscore.

The diegetic music also took two years to develop and followed multiple parallel tracks. For historical materials, I drew on the work of individual experts – musical anthropologists, archaeologists, highly skilled craftspeople who reconstruct ancient instruments, local Greek practitioners. On the one hand, we created facsimiles of ancient Greek songs based on texts of the period, such as the sea shanties for which melodies were devised by Dimitris Ilias of Chroma Musica and Giannis Georgantelis. On the other, we themed our choice of story songs, which reflect the specific narrative and character arc of the game, around the notion of *odyssey*. The lyrics for these were written by Emma Rohan, with music composed by Giannis Georgantelis. All this also fed back into the commissioned non-diegetic material.

Finally, there is the life of our game music outside the game. This is a new collaboration in itself. The music experience we deliver lives on through players' imaginations, in the many cover versions and reinventions players spawn. They reinterpret and share their work in the even wider context of social media. Many reworkings exist of the murder ballads and underscore from *Syndicate*. The first cover of the main theme track from *Odyssey* was uploaded before the game itself was released. This is a greater celebration of game music, seen also in the recent *Assassin's Creed Symphony* series and many other live music events. This community that has developed around game music is huge, ever-evolving and constantly energizing. It is perhaps appropriate that my brief remarks end with them.

Lydia Andrew

Quebec, March 2020

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