Game Sound Technology and Player Interaction: Concepts and Developments

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Appendix

ABSTRACT

What will the player experience of computer game sound be in the future? This was the question posed in an online discussion forum to which the book’s contributors were invited to respond. What follows is a free-wheeling debate about the future of game sound. Little editing has been done, other than the most obvious grammar, syntax and spelling errors, in order to maintain the fresh, often off-the-cuff responses. Three related themes become apparent in this discussion: affect, emotion and biofeedback; realism versus alternative realities; and the need for a game-sound design aesthetics. The first opens up interesting possibilities for enhanced player interaction (including player-player interaction across networked games) and immersion. Although authors and games companies often talk about the player being immersed in the gameworld, it is clear that current technology only hints at the potential. Similarly, games companies often praise the realism of their game sounds: even the iconic sound of Atari’s Pong of the early 1970s had its synthetic tones described as “realistic”. But which realism is being alluded to? What precisely does this Holy Grail of realism represent and how should it be attained? Is it the authenticity of sound that contributes to game realism or its verisimilitude in the context? If the latter, does realism derive from expectation, culture and genre and what debt does it owe to other forms of media? If realism refers to an emulation of reality, do we mean social realism, thematic realism, consequential or physical realism and who wants to play reality anyway? These questions directly relate to the need for a game sound design language: something that is still nascent. Game sound involves a very different paradigm to the derivation and perception of sound as found in reality or any other form of recreational medium. Like real-world environments, game sound derives from the actions of and upon its entities but it is triggered from a different rather than issuing directly from those entities. Unlike cinema, games require the willing and active participation of the player to effect the game and its sound. Whatever the future holds, it is clear that we have only begun to discover the possibilities inherent in computer game sound.
**Grimshaw:** There are a number of ways to approach this. What will the picture be in 1 year, 10 years, 20 years, how will the technology change, what interfaces/outputs might we have, do we need realism (what type of realism), what will change in the player’s perception, how will sound design change, are there ethical questions involved in biofeedback and so on?

I’ll start this off by saying that games of the future will conduct a form of dialogue between player and sound where the sound itself becomes an active, participating character in the gameworld working in tandem with the player to increase his/her experience and immersion. This will be achieved through biofeedback whereby the game constantly monitors the player’s immediate affect and latent emotion (through EEG, GSR, ECG, EMG etc. -- devices such as Nia and emotiv headsets are tending in this direction) and responds by synthesising new sounds and processing NPC speech. In the former case, parameters of sound such as frequency, timbre, intensity, ADSR envelope will be modified; in the latter, pitch, stress, rhythm and so on will be modified (I’m imagining real-time synthesis of NPC text files with an emotive envelope/pattern applied according to player state and game context).

So, the game engine senses the player is not frightened enough? Up the ‘fear’ controller to alter the synthesis of sounds and add a worried tremor to NPC speech. Perhaps this should be taken the other way. The player is about to have a heart attack so an emotion governor kicks in to calm them down by synthesising soothing sounds (after all, presumably game companies don’t want to be sued). Players can be kept on just the right level of emotional rollercoaster.

Of course, before all this is possible, there needs to be substantial research into what it is about sound that induces fear (or happiness, sadness etc.). This will need to take in context, past experience of the player and their culture/society (various literature reports that different nationalities view very different engine sounds as exciting and sporty -- Ferrari for Italians, Porsche for Germans). The game setup menu might have faders for nationality, gender and age.

This type of technology will void the requirement for game sound designers because it will be the players (their psychophysiological state) who design the sound on the fly. Some role might remain for the creation of specific sounds but sound designers will find their role greatly decreased in the games industry. Of course, it also opens up new avenues, creative ones, outside the industry -- the technology described above leads to the possibility of being able to design/create sound by ‘thinking’ about it -- presumably, the most creative soundscapes created in future will be thought by the most creative minds.

**O Keeffe:** Perhaps in 20 years, sound will be considered less important, characterised as an interference with game play. In the real world, sound within urban spaces is constantly being categorised as noise. If we continue on the path of highlighting post modern soundscapes as noisy environments we justify silent virtual spaces, places to escape to sound of the real.

**Grimshaw:** Rather like ‘silent’ rooms in busy corporate and academic campuses.

**Liljedahl:** There is also the concept of “perceptualization” which is interesting in the view of the very well established “visualization” and the at least in some communities well established “auralization”. In the future, sound, graphics and other media types will be more integrated. Today, what we see and what we hear do not necessarily match. One example is room acoustics. When
for example the content of a room changes during the course of a game, the acoustics does not. With new, better methods to simulate reverberation and acoustic occlusion culling will add to realism. Along the same line is the idea that the sounds of the game could adapt to the acoustics of the physical room where the player is located. This can be used in pervasive games to blur the borders between the virtual reality of the game and the physical reality of the player.

Liljedahl: I like the idea with silent rooms. It opens up for new types of games where realism is not self evident or the only aspect of the game media.

Liljedahl: Perhaps we have done what can be done given the sound technology available today. Decades of film, TV and computer game production have exploited many of the possibilities doable with today’s relatively static audio tools. New levels of interactivity will put new demands on the ability to create dynamic soundscapes. New DSP technology will open up totally new possibilities to create far more dynamic soundscapes than today.

Grimshaw: I was chatting with a colleague last night who works in (visual) SFX and he was describing some visceral scene in one of the Saw movies (a leg being chopped off or something). According to him: “Sound makes the image look better” (my italics).

I wonder if it’s ever the case that “image can make the sound sound better”? Many of the chapters in the book make the point that sound tends to be subservient to image particularly so in the production process and this is illustrated by my colleague’s comment.

Regarding the comment here that “what we see and what we hear do not necessarily match”. Do they need to? In the example of the leg being chopped off, I’m assuming it’s not a real leg attached to a live human being. Yet, the horror works because the context, latex leg, blood, screams and other appropriate sawing and chopping sounds make us “see” what we do not see. Again, this is a case of sound making the image look better -- the scene would lose its power without the sound (just as Tati’s films would be nothing without his absurd sound use).

What would a future be like where, instead of putting sound to image (to make it look better), we put image to sound (to make it sound better)? (I wish to ignore musical forms such as ballet, musicals etc. here.)

Cunningham: Bio-feedback will surely play a big part. It sounds so cumbersome and intrusive now but the technology will come along to let us do it in more discreet and passive ways. In the meantime the scope is there to research the human physiological responses to sounds of fear, joy, sadness, and so on. Improving computer models of emotion and AI engines will mean that the game can, in turn, adapt to the changing state of the player.

Silent rooms are interesting. I would classify Second Life as being something of a pseudo-game, but I frequently find myself turning the ambient noises and music down or off - as I find it easier to get a handle on what my avatar is doing and the interactions it is having with other characters and objects. Perhaps this comes back to the concept of “realism” in games. I think we can already produce game sound that is 80% or 90% realistic, especially using surround sound. I suppose what we need to consider is: is realism needed and what are the effects of it on game players?

If we do want realism, then the technology has to get better. I don’t want 5 or 7 speakers dotted
round the walls of my living room (and neither
does my missus!). Wavefield synthesis would be
great too but it’s not practical for the average man
in the street. Do we need to go back to HRTF or
are thin, wireless speakers the way to go?

Wilhelmsson: *What would a future be like where,*
*instead of putting sound to image (to make it look
better), we put image to sound (to make it sound
better)? (I wish to ignore musical forms such as
ballet, musicals etc. here.)* (Grimshaw)

One way to obtain this state would be to start the
process of game design with the sound or at the
very least let the sound designer become a part of
the process from the very beginning. I would say
that some ideas from moviemaking could come in
handy. Pudovkin’s ideas on asynchronsim for
instance. Use the sound to communicate with
the player what the images do not and stress that
invisible part as game play foundation. Maybe
abandon the image as progenitor of the sound
more or less totally. However, that is not likely to
happen. A more likely development for the player
experience of computer game sound would be less
compressed audio files which in turn might lead
to a sound environment that has a more “natural”
dynamic range. If processing power of the sound
would keep up with or overshadow the processing
power of graphics cards we might have less a need
for high compression on the audio files. Would it
not be nice to have multiple processors and 128
GB to just handle all the audio files in a game?
What more? The player will probably benefit from
more refined audio technology with directional
sound. Why not continue the reconfiguration of
our daily living environments yet another step and
make full use of directed sound technology? Let
the player experience the sound without disturbing
others and not force her to use headphones. This
sound strategy could very well have the positive
side effect that the player might be forced to move
around to hear all that there is to hear. In a world
with new control devices surprisingly little has
been done on the side of audio technology sad
enough.

Cunningham: I guess to answer the question
directly, the player experience of computer game
sound in the future will be an one that is totally
transparent, pervasive, and natural.

Alves: *One way to obtain this state would be to
start the process of game design with the sound
or at the very least let the sound designer become
a part of the process from the very beginning.*
(Wilhelmsson)

Yes, I do believe that’s the way to go. Though
there will always be the need for people with the
technical ability to deal with sound, the real deal
is to ensure that sound is explored in its depth. Not
only as sonorization but also as part of meaningful
components of the game where sound is relevant
for the course of action and for the inhabitants of
the gameworld.

To accomplish that, a sound designer (meaning
a designer who is aware and attentive to sound
potential) ought to be involved right from the start
of the design process.

Yet, I do not believe that we should be looking
for ways to ensure that a game will have sound.
My understanding is that sound as any other
modality should be subservient to the global
communicative purposes of the game, let’s say
to the accomplishment of an emotional script. In
that sense, ultimately, if the best use of sound in
a particular game is to keep silence, so be it - that
will be good sound design too.

Anyway, my point is that for the designer to be
able to use sound whenever and however it should
be more appropriate, it is fundamental to be able
to design the game with such design decisions already present, in counterpoint to have the game already defined and trying to find the best way to fit or to wrap it with meaningful sound.

Alves: is realism needed and what are the effects of it on game players? ... If we do want realism, then the technology has to get better. (Cunningham)

Realism is certainly interesting. Still, I tend to feel that the actual issue is the adequacy of sound to the “reality” of the gameworld (which can be very disparate from that of the real world). That is, the realism relative to the gameworld.

One important aspect of this inner realism, I believe, is coherence. Coherence with visuals, with physics, and among sounds. I mean, the whole setting should be believable (or at least it should not ruin the player’s will to believe in the gameworld).

Alves: In addition to the contribution of sound to the enrichment of the gameworld, I’m also hoping that sound will contribute to make the act of playing a more enjoyable experience, per se. I mean that the use of sound, particularly as input, can change the way a player interacts with the game interface with possible improvements in the overall experience.

I’m expecting that sound will become increasingly bidirectional. And that means that someday we will be sending all sorts of sound into the game. In turn, that seems to call for a much more active interpretation of the role of playing -- no more sitting still and mute, just clicking or pressing keys. That is, the actual behavior of the person who is playing, while playing, may change.

I also believe that roaring or making some kind of bizarre noise towards the game will tend to promote collective experiences. This is, of course, just a feeling but I guess if I would have a game where I was supposed to do a lot of yelling, I would certainly guarantee a good laugh if I could use the help of some friends or family (I mean, in loco, not online).

It seems to me that a game interface that allows a more expressive activation is also more prominent to sharable experiences.

In turn, if there is some truth in this foresight, we are also talking about new opportunities in terms of game design. We may be willing to address more attentively the design of games that are meant to provide collective experiences.

Cunningham: A quick thought in regard to the last post by Alves, discussing the use of sound as a game input and the role playing of the game player. I’ve often thought it might be interesting to conduct a study of the type of speech and non-speech sounds made by games players during play. I’ve often found myself muttering, cursing, elating, and so on in response to the stresses, failures, and victories in the game scenario. If the game could respond to such utterances this could lead to an even more dynamic and interactive experience.

Droumeva: perhaps in 20 years, sound will be considered less important, characterised as an interference with game play. In the real world, sound within urban spaces is constantly being categorised as noise. If we continue on the path of highlighting post modern soundscapes as noisy environments we justify silent virtual spaces, places to escape to sound of the real. (O Keeffe)

This made me think of a captivating user video I once saw on YouTube from a “walkthrough” of Grand Theft Auto: Liberty City. The player was moving his avatar and narrating his actions, and
basically he wanted to talk about the depth of exploration one can get to in GTA (a game that, as we all know, has had a reputation for being gratuitously violent), how rich the environment is, etc. He walked his character all the way away from the city - saying that “it was too noisy and busy” and into “Central Park” in order to “enjoy some quiet nature sounds and peace of mind, away from it all” - it just struck me as a most curious simulacrum - finding the precious solace of “realism”, of reprieve from a noisy environment in a game - in the quiet natural soundscape of a game!

To me, that signifies one possible future for game sound - it will be more and more the “real” environment of young people as opposed to the real soundscapes of the noisy, urban, overcrowded off-line world. So design has to be conscious of that, absolutely, how - I’m not sure...mimic closely and thoroughly our surrounding acoustic soundscapes, or foster completely imaginary worlds?

**Grimshaw:** I think foster completely imaginary worlds. It’s the ‘otherness’ of other environments that captivates players and I for one would see no reason to immerse myself in a world exactly the same as this one.

**Hug:** Following up on the initial question (and some related points made during the discussion)... I agree with Grimshaw that there is a strong possibility biofeedback will be used in some form to control game engine states, including real time sound synthesis. However I am not convinced that this will necessarily lead to improved player experience. The problem is, that if players are aware of these mechanisms (and they surely will be, because advertisements, making- ofs and magazines will make a rave about it) this will already alter the way they approach the game. Usually, once we are aware of a certain level of control, we will try to subvert a given system. In the traditional narrative, the fearful sound works just because we have been “guided” toward it by the linear storyline (and the sensory experiences that accompany it, think “calm before the storm”). In the perspective of an ad-hoc modification of synthesis parameters it might well be that we constantly reflect the fact that our behavior has an impact on the events, which might make the actual events much less interesting.

A second issue is to deal with the nuances in perception, behavior, and the possible contrast between measured states and felt states. Biophysical excitement might have different causes, so altering the assumed cause might trigger the wrong feedback loops... But that’s a subject of a lot of research anyway.

But I also see a huge chance for creative practice in such technologies. However, this seems to require the invention of new game genres. I think the traditional “narrative” approach to game design (more or less linear, storylines, quests) has a few merits (subtly changing the sounds based on player’s states, as described), but it would not be the most suitable approach to leverage the full potential.

The play with emotions in itself could become part of the game, and the player would have to use his self-control over emotional states for actively controlling aspects of the game. Imagine you are a virtual spy and have to trick a lie detector or an investigative detective... Ok that’s more traditional narrative again, but what I want to say is: It might be worthwhile not to try to hide the system, the apparatus, from the player, but make it available to them as tool for action.

How this connects to sound? I strongly believe that there is a big potential in the possibility of linking a virtual sound world with the actions of the player. This may be partially controlled by biophysical monitoring systems, but I think at least
equally important are (physical) game controllers. And I mean not just Wii Motes, but the idea is that everything can become a game controller in a “mixed reality”. The interesting differential then (and it’s this differential that is the most exciting to design) is between the player’s actions and the sounds as manifestations of this action in the game world. So biophysical monitoring would not mainly be used to adjust the sensory output of the medium to alter the player’s emotional state, but it would be used to give the player an additional channel of expression.

Imagine a game where players learn about the sonic behavior of virtual artifacts (and the way they have to handle them using their physical placeholders or project natal - body movements), where totally new and surprising action-sound relationships could be designed. And the mentioned input channel for speech & nonverbal expressions could play an important part in it. Remember the audio-gun from Dune?

**Hug:** Addressing Droumeva’s point. There is always a fascination in the simulation of “reality”, and actually I think part of the fascination comes from the knowledge that you are not “out there” but sitting at home in your full immersion suit listening to binaural soundscapes. I think this will always have its place and justification.

But on the other hand, I think Grimshaw is right. It’s the “otherworld” that we seek to flee into. This otherworld certainly is composed of familiar elements but deconstructs them and surprises us with the unexpected.

In general I think that creative and more sustainable potential lies in the definition of new aesthetics rather than simulation of the familiar and “real”. I think game sound could take an example in how film sound was pushed into a media language of its own, establishing design strategies that have become kind of “naturalized”, are inherently part of the aesthetics of the medium. Game sound thus should explore new directions and for that we need people (artists?) that abolish preconceptions and just try out crazy stuff.

I think no one can exactly say how a game sound aesthetics will or should be like, but we can say that we have to explore unorthodox paths and eventually, a new “language” will emerge. I also think, that the directions towards which such an exploration could go can be derived of some genuine qualities of the medium. Think about the idea of “montage” in film which was one of the strongest catalysts for audiovisual innovation. In games, it is maybe not so much about audio-visual montage, but about action-feedback montage. De-constructing familiar action-feedback loops and creating new ones.

Another field which is prone to artistic exploration is “diegesis” of game sound, as it seems very unclear where diegesis starts and ends in a medium where a narrative is not passively consumed but actively co-created as player experience. Film sound has developed a great variety of ways to establish or support diegesis, as well as how to integrate non-diegetic sound to serve a narrative. In game sound this is still terra incognita to a large extent, in particular if we look at genres with “low narrativity”.

**Grimshaw:** Certainly the player may subvert the system I propose and that might be part of the fun (and would all players be aware of the possibility and, even if they were, would the apparatus recede into the background with familiarity and the needs to play the game in order to reach the desired outcome?). However, why not have the game subvert the player? The sound engine need not slavishly mimic the fear of the player, for example, it could do the reverse and stubbornly refuse to help that emotion along until the player is lulled into a false sense of security and then....!
Appendix

I like the idea of having to use emotion to navigate the game (and this feeds into more than just sound). You’re right Daniel [Hug], such a game would probably require a new genre (can I bag the name first as ‘emotive gaming’?) where the game itself emotionally engages with the player, becomes a character itself.

Hug: However, why not have the game subvert the player? The sound engine need not slavishly mimic the fear of the player, for example, it could do the reverse and stubbornly refuse to help that emotion along until the player is lulled into a false sense of security and then...! (Grimshaw)

Well I doubt this degree of control over the player’s emotions can ever be achieved, simply because of the ambiguity of interpretation. It’s maybe a bit like with psychoactive drugs: for some a dream for others a horror trip (or even for the same person under different circumstances). This is why I think the power of biofeedback should maybe be seen as another channel of agency for the player rather than hiding it.

Hug: My vision of a tool for game sound design: A hybrid foley box which seamlessly integrates physical modeling and all kinds of synthesis methods as well as real-world recordings and re-synthesis. The most important feature will be a sonic pipette: just grab a sonic residue somewhere, drop it into a placeholder object, combine with “sonic drops” from other sources, including virtual ones drawn from physical models, create an envelope in real time by singing into it and then define a set of mapping criteria to attach it to an entity of your game world (objects, npcs, avatars) and play around with the object and its sounds in realtime in the game world.

If anyone would like to help develop this, let me know!

This actually also points to a question related to the future of game audio in general, if procedural methods really are the future: at which point does the actual sound design take place? Will we be merely adjusting parameters of simulated physical entities? How do we achieve the magic and the “bigger than life” effect and surprising, new sounds, if everything is controlled by a “realistic” simulation engine? Is there a way to combine the strengths of procedural audio with old-fashioned compositional sound design? Well, my idea of a hybrid foley box would maybe be a way to join these worlds...

Grimshaw: Well I doubt this degree of control over the player’s emotions can ever be achieved, simply because of the ambiguity of interpretation. It’s maybe a bit like with psychoactive drugs: for some a dream for others a horror trip (or even for the same person under different circumstances). This is why I think the power of biofeedback should maybe be seen as another channel of agency for the player rather than hiding it. (Hug)

I can dream.... Certainly a lot of work needs to be done: fundamental research into mapping emotion/affect to sound parameters not to mention precise and accurate measurement of such emotion/affect. It may well be that it’s a long time before we move beyond the blunt tool of mere positive/negative valence and are able to precisely identify fear as opposed to anxiety for example.

However, (once that research is well under way) personal emotion profiles for individuals could be stored taken from ‘set-up’ measurements and this would allow more precise targeting of individuals.
**Grimshaw:** This actually also points to a question related to the future of game audio in general, if procedural methods really are the future: at which point does the actual sound design take place? Will we be merely adjusting parameters of simulated physical entities? How do we achieve the magic and the “bigger than life” effect and surprising, new sounds, if everything is controlled by a “realistic” simulation engine? Is there a way to combine the strengths of procedural audio with old-fashioned compositional sound design? Well, my idea of a hybrid foley box would maybe be a way to join these worlds... (Hug)

Now there’s an interesting question. Anyone?

**Droumeva:** In general I think that creative and more sustainable potential lies in the definition of new aesthetics rather than simulation of the familiar and “real”. I think game sound could take an example in how film sound was pushed into a media language of its own, establishing design strategies that have become kind of “naturalized”, are inherently part of the aesthetics of the medium. Game sound thus should explore new directions and for that we need people (artists?) that abolish preconceptions and just try out crazy stuff. (Hug)

I completely agree actually, got wrapped up in making a point about the experiences of “reality” which, I believe, will still be an important social experience in gaming, albeit - agreed with Grimshaw and Hug that gaming is more about a different reality than re-immersing into a nostalgic version of past realities. (whatever it is that those “alternate realities” end up being). And I do retract my previous implication that “reality” should be somehow integrated into game sound design, or be a design principle - I meant it strictly as an important cultural byproduct and social experience.

I love the idea of biofeedback and I do see that coming in a more mainstream way into gaming in the 10-year prediction range - and hopefully by then game sound will operate with a new and improved “media language” - crazy artists would have made their mark on the interactional mappings between game sound and game input, as well as the structure and mechanics of gaming period, so biofeedback might literally control the soundscape or at least the avatar’s own soundmaking in the game (assuming a narrative structure once again, I know) as a mechanic. I think along with biofeedback, I see remote networking tangible controllers - things that can send sensations like touch, temperature, pressure, perhaps sound and breath, vibration, rhythm, to a remote player. I also like the idea of players being made to understand more how game sound is synthesized and be able to take part in that process more actively, though this point makes me wonder if the future of gaming is all about “opening up” the programmatic side of games and making players-as-producers - I don’t know if that might result in really bland, generic game structures that are the “blank slate” upon which players build up game worlds and game feedback. That said, I can definitely see, within a year even, game sound being customizable - i.e. players being allowed to upload their own sound effects to each game, and thus construct their own soundscapes.

But regarding the general question of future of game sound - obviously related tightly to the future of game genres, and game mechanics - I also see a rise in “lifestyle gaming” and “human computation”. Lifestyle gaming I’d call things like Wii Fit, Brain Age, the multitude of “games” that are essentially utility applications thinly veiled as games. Game sound is bound to be affected by this shift. Thinking specifically of biofeedback, I can definitely see it being used in “lifestyle games” for anti-anxiety, meditation, stress control, etc. and
that would entail different (perhaps more secondary, limited, or perhaps more information-based/driven) uses of game sound than entertainment games - driven by a quest for playfulness, fun and challenge.

Human computation - the use of gaming structures for humans to do actual work, may be fringe now, but I see it rising with trends like education technology (I myself am in that field, somewhat...) and I can't help but thinking game sound - its potentials for fun and playfulness - might suffer, should pragmatics over-ride aesthetics and playfulness. Just throwing this out there...

Grimshaw: I don't think game sound will suffer. Pragmatics might be needed should game structures broaden their reach into non-gaming areas because such areas are not intended to be games and therefore do not need (necessarily) game aesthetics and playfulness.

Grimshaw: With regard to Droumeva, you brought up the idea of network tangible controllers. What about extending this to incorporate biofeedback in a multi-player system? We've already discussed using a player’s psychophysiology to affect/effect sound in the game and, due to the nature of networked games, assuming the new sound then has a feedback effect upon the player, this will probably have an effect upon gameplay and other players. So far, the biofeedback sound is only heard by the one player -- could the parameters used to drive the sound synthesis/processing also be sent via the network to other player's audio engines? In a horror game, can players then sense the fear of others?

Hug: There is something in this discussion which strongly reminds me of mid-end nineties discussions about full immersion cyberspace, telepresence, body-suits, etc. This vision might now actually become technically feasible.

But just to give this a twist into a slightly different direction: What if in the future (which actually has already begun in some ways) there is no “closed system” of gaming anymore? No dedicated software and hardware interfaces? When gaming is pervasive, where you are, where shopping for food becomes a quest for the one milk bottle which contains the key to level 92? When your CO2 footprint directly links to your avatar’s stats and to bonus programmes offered by a green power syndicate?

What of sound, then, being neither a reflection of a (constructed) reality nor the expression of a separate, self-referential aesthetic system (“game sound aesthetics”, think 8 bit...), but an element in a hybrid, electroacoustic soundscape? I’m doing some extensive research on sound design for interactive artifacts for everyday use and there I constantly run into this question. In this scenario there is no distinguished system of aesthetic codes anymore as we know it from film and today’s games, there is no entering or leaving a specific application, environment, cinema, game, etc., there is just a constant “multilayeredness” of presence and agency - or maybe a constant switching between presences. And this poses fundamental questions about what might be suitable (sound) design strategies. How do we combine, merge, juxtapose, subvert the “naturally occurring” physical sounds, and the sounds of a pervasive gaming system? And how do we integrate these sonic events into the socio-cultural fabric of everyday life?

This sounds maybe far out, but then again, it is happening already. Do we need to investigate not only the “acoustic ecology” of the game, as pointed out by Grimshaw in his work, but an acoustic ecology of our game-lives?
Or, might it be possible that in the end, humans will always prefer to experience the transition between systems, to know when they are inside or outside a game, work, “real life”?... Where the power switch (and the “mute” button) is?

Alves: hybrid, electroacoustic soundscape (...) might it be possible that in the end, humans will always prefer to experience the transition between systems, to know when they are inside or outside a game, work, “real life”?... Where the power switch (and the “mute” button) is? (Hug)

In such scenario: no switch, please... We are entitled to a playful life!

I guess if we are able to enhance any aspect of our lives then it should become legitimately persistent (just as shelter, clothes, food, and education). We would deal with ‘new sound’ the same way we currently deal with other sounds we are able to control: should a sound become inconvenient in any particular circumstance, we would behave in a way it would not happen.

ENDNOTES