

<b>Institution:</b> Bath Spa University		
<b>Unit of Assessment:</b> 33 - Music, Drama, Dance, Performing Arts, Film and Screen Studies		
<b>Title of case study:</b> Seeing Sound: Building an Interdisciplinary Community of Practice for Visual Music		
<b>Period when the underpinning research was undertaken:</b> 2012 - 2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Prof Joseph Hyde Paul Jebanasam	Professor of Creative Music Technology Senior Lecturer in Creative Music Technology	2/10/2000 - present 18/8/2015 - present
<b>Period when the claimed impact occurred:</b> 2013 - 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<p><b>1. Summary of the impact</b></p> <p>Research at Bath Spa has taken a leading role in defining and contextualising the emergent creative discipline of Visual Music (the artistic expression of musical ideas through visual media). The research has built an international interdisciplinary and multisectoral community of practice for Visual Music. Hyde and Jebanasam's research (including practice-based works, and large-scale projects) set up the world's first Visual Music symposium, <i>Seeing Sound</i>, which has built up a dedicated community and provided a context for connected Visual Music research and practice in both cultural and academic environments. Through <i>Seeing Sound</i>, Hyde and Jebanasam have taken a leading role in developing a Visual Music community and supported practitioner development at different career stages. The interdisciplinary nature of Visual Music means it does not conform to traditional models of music or media and so does not necessarily fit the usual requirements and formats associated with concerts, film festivals or art exhibitions. At the same time, whilst it can involve scientists and engineers, it does not necessarily lead to traditional outcomes in these disciplines or industry contexts. <i>Seeing Sound</i> has created a space for sharing this work and the community that has developed around <i>Seeing Sound</i>, as well as through Hyde and Jebanasam's individual projects, mixes researcher-practitioners from the arts and sciences, freelancers and creative organisations. The intersectoral and highly interdisciplinary nature of the community which research at Bath Spa has helped shape has been central in establishing Visual Music as a creative discipline in its own right.</p>		
<p><b>2. Underpinning research</b></p> <p>Hyde and Jebanasam's research in Visual Music is carried out within Bath Spa University's Sound Arts and Visual Music research group. This emerging field of audiovisual practice is characterised as the artistic expression or representation of musical ideas or material through visual media (R3). Hyde has written widely on Visual Music, with an aim of establishing a connection to music theory and analysis as most previous writing on the subject was sited within cinema, fine art or media studies. His writing has primarily been concerned with focusing on the musical and sonic aspects of Visual Music, which is somewhat neglected by most writing on the subject in other disciplinary contexts. He has edited a journal issue on this topic (R4), given a keynote paper outlining a theoretical framework (R3), and contributed several chapters to books covering the field (eg R1).</p> <p>Hyde's edited journal issue of <i>eContact!</i> (R4) demonstrates parallels between the development of electronic music and video, primarily through interviews with practitioners who had been involved in both. The issue was published by the Canadian Electroacoustic Community, which is the leading membership community in the world for electroacoustic music, and extended knowledge and understanding of the emergent discipline to this community of practice. Hyde's research (2012-2013) on key Visual Music pioneer Oskar Fischinger focused on previously unstudied musical scores Fischinger produced for his films, and a prototype form of optical synthesis he developed, but never completed, in his late years. Hyde's analysis of the Fischinger scores proved how deep Fischinger's musical understanding went and detailed how musical forms and processes guide visual form and motion. This research was disseminated through 2 chapters in a new monograph on Fischinger (R5) and a section of the Fischinger exhibition at the EYE Filmmuseum in Amsterdam.</p>		

Hyde and Jebanasam have also produced a series of practice-based research projects, primarily based in music and the arts, but also in a wider creative industries context across technological development, engineering, and science. These projects have ranged from fixed media audiovisual works to large-scale performances and installation works and have involved the development of software for specialist applications, such as the translation of scientific methods and principles to an artistic audiovisual context. A key theme has been the visualisation and sonification of scientific data. In Hyde and Jebanasam's research this has focused on investigating how sound and image can be used to facilitate understanding of large and complex datasets, both for those deeply engaged in research and for a broader public. This focus is a strong current in Visual Music practice (and a thread throughout the *Seeing Sound* events) and an exemplar of the benefits of this kind of interdisciplinarity.

Hyde's work on *danceroom Spectroscopy* (R6) has involved the sonification of a complex real-time molecular system. The system captures participants using volumetric cameras and interprets their movements as energy fields, which are embedded within a cloud of particles that is rendered and projected in real-time. Presenting fundamental research in an interactive, immersive and aesthetically compelling format invites participants to literally step into and play with a rigorous atomic and molecular dynamics simulation. This system allowed many users at once to be placed inside a scientifically-accurate molecular simulation, and the sound in particular provided a way for more complex data, such as the propagation of waves through large numbers of atoms, to be readily perceived. This interactive strategy has also been explored in a VR context in *Interactive Sonification in Virtual Reality* (funded by an APEX award).

Jebanasam's audiovisual work *Continuum* (R2) explores new ways in which sounds and images can be composed to depict states of matter and energy that are ordinarily outside the field of human perception. The sound composition used FFT cross-synthesis techniques to produce organ-like textures which were then processed through vacuum tube equipment pushed to saturation points. *Continuum* is underpinned by the principle of using sound and image spectra as metaphoric representations of life, entropy and energy across cosmological timescales. The works and strategies produced through this research developed new compositional methods based in a language of hyperreal forms and present a new development in the representational capacities of the audio-visual artform.

### 3. References to the research

**R1** Hyde, J (2020) ['The new analogue: media archaeology as creative practice in 21st century audiovisual art.'](#) In: Knight-Hill, A, ed. *Sound and image: aesthetics and practices*. Routledge, Abingdon, pp. 188-205.

**R2** Jebanasam, P (2020) [Polymorphism in audio-visual composition \(2016, 2020\) \[research portfolio\]](#)

**R3** Hyde, J, Mitchell, T and Glowacki, D.R (2014) [Molecular music: repurposing a mixed quantum-classical atomic dynamics model as an audiovisual instrument.](#) In: XVII Generative Art Conference, 10 - 15 December 2014, Il Tempio di Adriano, Rome, Italy.

**R4** Hyde, J (2014) ['Editorial \[quest editor\].'](#) *eContact!*, 15 (4). Videomusic: Overview of an Emerging Art Form.

**R5** Hyde, J (2013) ['Fischinger's scores: new perspectives on his approach to music.'](#) In: Keefer, C and Guldmond, J, eds. *Oskar Fischinger 1900-1967: experiments in cinematic abstraction*. Eye Filmmuseum; Center for Visual Music, Amsterdam; Los Angeles

**R6** Hyde, J (2018) [danceroom Spectroscopy 2.0 \(2014 - 2018\) \[research portfolio\]](#)

#### Funding

- Hyde (PI), *Visual Music pioneer Oskar Fischinger* (2012-2013), AHRC, GBP39,328
- Hyde (Co-I), *Breathing Stone* (2014), AHRC REACT KE hub, GBP14,056
- Hyde (Co-I), *Interactive Sonification in Virtual Reality* (2019-2021), The Academies (APEX Award), GBP98,752

### 4. Details of the impact

Hyde and Jebanasam's research has taken a leading role in building an international interdisciplinary and multisectoral community for Visual Music. The interdisciplinary nature of Visual Music means that it is built around the interaction between practitioners and researchers (and researcher-practitioners). Visual Music does not conform to traditional models of music or

media, meaning that it is innovating new music environments and experiences, outside the traditional formats for concerts, film festivals, art exhibitions or industry contexts. The community developed by Hyde and Jebanasam through *Seeing Sound* and their own practice involves artists, researchers and organisations from both the arts and sciences and has helped shape Visual Music as a discipline in its own right and been instrumental in developing international Visual Music practice.

### **Building a Visual Music Community of Practice**

Hyde and Jebanasam's research and its outcomes have shaped the development of Visual Music as a global community, especially helping to break down boundaries between disciplines through multisectoral collaboration. *Seeing Sound* has been instrumental in building a community around Visual Music since the inaugural 2009 event, the world's first symposium in this field. This community is diverse and inclusive: it brings together people engaged in the arts, science, engineering and creative industries. Crucially, it allows a dialogue to flourish between researcher-practitioners (around 50% of the community) and those working in commercial/freelance sectors. The conference brings together practitioners and researchers from different disciplines and has taken place in 2013 (November), 2014, 2016, 2018 and 2020 (E1). It employs an innovative practice-led model and has provided a context for developing practice and research through an exchange with peers from around the world.

The community created by *Seeing Sound* is global, and its strength and reach is demonstrated by the work of its constituents and the participant data. Since 2013, the events have hosted over 1000 delegates, with over 200 people presenting their practice and research, contributing to panel discussions, and giving performances. *Seeing Sound 2020*, which was staged online, attracted 297 participants from 32 countries (E1). The events have developed collaborations between participants and partner institutions. For example, the 2020 online event included an international collaboration in the form of a 'Global Music Marathon' - a continuous 12-hour live stream curated and produced by Bath Spa and partners in North America (Université de Montréal and Boreal Electroacoustic Music Society), Asia (SoundLab and City University of Hong Kong) and Australasia (Seen Sound and Loop Project Space Melbourne). Jean Piché (a senior artist) writes:

*Seeing Sound* brought together a worldwide community of like-minded artists who previously had few places to exchange, promote and guide the development of this new field. *Seeing Sound* has become the most important international forum to present my work and discuss ideas pertaining to all aspects of my practice. (E7)

*Seeing Sound's* international draw and event programming has facilitated new conversations and collaborations (E6, E7, E8), encouraging the intersection of different areas of practice and practitioners from different sectors within the field. The events have successfully brought researcher-practitioners together with independent artists, particularly through collaborations (with Encounters Film Festival in 2014 and the 2020 collaborations outlined above). The November 2013 event presented Hyde's collaboration *danceroom Spectroscopy* alongside the premiere of Yorke Dance Project's *Unfold to Centre*, featuring computer animation by pioneer Larry Cuba (who produced one of the first examples of computer animation in mainstream cinema, in *Star Wars*). In the 2016 event a theme emerged - directly from the *Seeing Sound* community - of cross-sensory perception in blind and partially sighted people. This was reflected in presentations by a partially sighted singer talking about her synaesthetic experiences of music, a film director making a documentary on an orchestra of visually impaired musicians and a team working on devices allowing the blind/partially sighted to perceive the visual domain through sound. In this way, *Seeing Sound* has stimulated new developments and opportunities for blind and partially sighted musicians and audiences.

The Covid-19 pandemic has provided challenges for *Seeing Sound* (and Visual Music more broadly) but also highlights its importance. Plans for a large-scale festival in Bristol in 2020 had to be shelved due to the pandemic, however, the online event indicated new ways of working and community building, in particular through the innovative use of live streaming platforms: YouTube, FaceBook and Twitch were combined to produce a two-day event that incorporated talks and discussions, live performances, interactive installations, 360 video and VR.

In their individual projects, Hyde and Jebanasam have also developed communities of practice around their work. By drawing together interdisciplinary teams to produce new methods, compositions, events, and participatory experiences, both researchers have created unique communities that present examples of long-term collaborative working.

Hyde has worked with an interdisciplinary group of researchers since 2012, including chemist Dr David Glowacki (University of Stanford, University of Bristol) and engineer Dr Tom Mitchell (University of the West of England) on a number of projects exploring the simulation of molecular systems and dynamics. Principal of these is *danceroom Spectroscopy* (2014-2018), which presents this simulation in a highly user-friendly way and has proven successful in widening understanding of this area of physics/chemistry with a broader public. This is reflected by the 6 awards attracted by the project (several specifically for public engagement), and many high-profile productions of the project - often in the context of non-specialist festivals not traditionally associated with scientific enquiry - and education events (E3, E4). The project reached over 100,000 people spanning ages from 3 to 83 (E4c). Audience feedback showed that *danceroom Spectroscopy* reached out to new audiences: "inspiring curiosity in people who otherwise feel intimidated by science" (E4c).

Jebanasam has worked with audiovisual composer and programmer Tarik Barri on *Continuum*, which they toured to 25 international festivals in 14 countries (2015-2018). The combined live audience of approximately 17,970 (E2) for these performances demonstrate the community generated by this work, which has also been reviewed internationally in print and online (E9). Jebanasam has participated in talks as part of the presentation of *Continuum* at Today'sArt and FIBER festival, widening the discussion and understanding of the work's technical and aesthetic developments within practitioner and audience groups (E2). In 2018, Jebanasam also developed the work further at IRCAM in Paris, extending the network of collaborators around the project and making further connections among the Visual Music community.

#### **Developing Visual Music Practice: Supporting practitioners**

Hyde and Jebanasam's research has taken a leading role in developing international Visual Music practice: offering opportunities for individual practitioners to develop their work and creating technical advances in the field. Visual Music is an interdisciplinary field that often involves creators working outside of their home territory. Such practitioners include musicians choosing to make visual media a core part of their practice and visual artists and media creatives foregrounding sound in their work. Those extending their practice in this way often feel that their work does not fit the discipline-specific criteria of film and music festivals, concerts and art galleries. The *Seeing Sound* events have provided a context for this work and been instrumental in growing an awareness of, and community around, this area of practice.

*Seeing Sound* and the community it has developed involves people at all stages of their career. It has provided opportunities for 60 people to engage with production of Visual Music work for the first time, through public workshops (2014). Audiovisual work can be seen as expensive to produce, so the workshops focused on hack solutions such as self-build analogue video synthesis tools and live coding using open source software (E5). *Seeing Sound* has also significantly supported the development of early-career artists and musicians engaged in Visual Music. Artists Myriam Boucher and Kathy Hinde both had their first high-profile exposure through *Seeing Sound* and have subsequently become internationally successful and have formed an ongoing collaboration through conversations at *Seeing Sound* events. Boucher writes:

"My participation in *Seeing Sound* 2018 allowed me to significantly expand my network of contacts in England. I met the artist Kathy Hinde (from Bristol, UK). This meeting led to a Quebec-UK collaborative project, financially supported by Mutek (CA) and Cryptic Glasgow (UK)." (E6)

*Seeing Sound* has also supported senior figures in the field, including curators and gatekeepers of Visual Music (primarily based in North America). Larry Cuba, *Star Wars* computer graphics pioneer, presented a Keynote lecture in 2013 and in 2016 he was commissioned to produce a special edition of his seminal work *Two Space* for Bath Spa's unique Media Wall. This immersive 6k version of the work subsequently received many showings in other contexts demanding such high resolution, such as planetariums, showing how opportunities created by *Seeing Sound* resonate beyond the event into the practice of participating artists. Cuba writes:

During *Seeing Sound* 2016, one of my computer-animated works, *Two Space*, an exploration of two-dimensional symmetries, was displayed continuously on the two-story high media wall at Bath Spa University. The presentation of such a large version of the film was spectacular. And as an installation, it became an ongoing part of the environment rather than the typical film screening in a theater. I had never had such an opportunity before and I haven't had one since. That *Seeing Sound* experience was unique. (E8)

*Seeing Sound* has featured presentations from several people who have subsequently curated other important Visual Music events. These include the founders of the Sound/Image conference at the University of Greenwich (since 2015), the Understanding Visual Music conference (various Universities in North and South America, since 2014), and the Sound, Image and Interaction Design symposium (Madeira Interactive Technologies Institute, Funchal, Portugal, since 2018). It has also featured the founders of the Center for Visual Music and the iota Center (both in Los Angeles). The latter writes:

The Visual Music community is very special, but spread far and wide throughout the world. There are very few opportunities to get together, to meet, to connect and to share. This makes *Seeing Sound* an essential component of our community. I look forward to attending many more in the future. (E8)

### Technical advances in Visual Music

Visual Music represents an extension of the boundaries of music and a vital part of its evolution. This is evident in Hyde and Jebanasam's work, which has contributed to developing Visual Music practice internationally. While cultural and technological shifts are making some avenues of music production and consumption less commercially viable, new arenas for the creative use of music and sound are developing. Many of these revolve around the use of music and sound in an audiovisual context (in areas such as audiovisual performance and installation work, games, VR and other interactive/immersive media), and more far-reaching interdisciplinary models which reach beyond the arts and into engineering and science.

Hyde's contribution to *danceroom Spectroscopy* centred on the sonification of vibrations in atomic bonds, and he developed an innovative approach using feedback loops in interaction between sound and simulation. Hyde led on a project specifically exploring these possibilities, titled *Molecular Music* (R3) which uses the physics simulation as the medium for audio-visual relationships, which mirrors the way physical materials react to vibration. This system has been used in collaboration with a number of well-known musicians, such as the Charles Hazlewood All-Star Collective performance of Terry Riley's *Rainbow in Curved Air* in the Bristol Proms at Bristol Old Vic in July 2014 (E3).

*Continuum*, Jebanasam's project with Tarik Barri (panelist at *Seeing Sound* 2020), involves extensive analysis of sonic and visual materials from several scientific fields including cosmology, nuclear physics and experimental computing. During his IRCAM residency, he worked with technicians to develop a customised multi-channel diffusion system for the presentation of the piece at the Philharmonie de Paris (2018). The technical and aesthetic concepts developed in this work have been discussed with audiences and other practitioners in pre-concert talks, panels and interviews in electronic music and media art publications (E2).

### 5. Sources to corroborate the impact

- E1 [Seeing Sound website](#) and documentation, including 2020 attendance data
- E2 *Continuum* (Paul Jebanasam and Tarik Barri) list of performances, venues and audiences
- E3 *danceroom Spectroscopy* (Hyde and collaborators) list of performances, audience responses
- E4 *danceroom Spectroscopy* (Hyde and collaborators): **a.** record of public engagement events and awards; **b.** NCCPE Award (Established Project Category 2014); **c.** [NCCPE case study](#)
- E5 Details of Arnolfini workshops on [Live Audiovisual Coding](#) and [Analog Video](#)
- E6 Testimonials from early career artists: Myriam Boucher (Montréal) and Kathy Hinde (Bristol)
- E7 Testimonial from senior artist Jean Piché (Montréal)
- E8 Statement from Larry Cuba - senior artist and Director of the iota Centra (Los Angeles)
- E9 Reviews of *Continuum* (Paul Jebanasam and Tarik Barri)