**Institution: UNIVERSITY OF BIRMINGHAM**

**Unit of Assessment: D35 Music, Drama, Dance and Performing Arts (Music)**

**Title of case study: SuperCollider Development and Dissemination**

**1. Summary of the impact** (indicative maximum 100 words)

The public domain computer program *SuperCollider* is used by a large and active community of composers and performers of electronic music worldwide. As one of the main developers of the program and co-editor and co-author of the accompanying book, Dr Scott Wilson's research has had impact in the following areas:

- Contributing to new methods of creative practice and supporting new forms of artistic expression
- Informing and influencing the development of expert systems
- Influencing the methods of composers and performers

**2. Underpinning research** (indicative maximum 500 words)

*SuperCollider* is an environment and programming language that can be used to generate and organise electronic sounds and to manipulate them in real time (1). Because of the latter ability, it can be used not only by composers, but also by performers who use the computer as a musical instrument. The program, first released in 1996 by James McCartney, is now in the public domain and may be freely downloaded.

The development of the program is an evolutionary process and has therefore been continuous since its first release (it is now in Version 3.6). Dr. Scott Wilson, Reader at the University of Birmingham is an active developer of the program, and has been working on it since 2003 (joining Birmingham as lecturer in 2004). His contributions have been in a variety of areas, including reworking and optimising SuperCollider's facilities for responding to external communication in the form of Open Sound Control messages or MIDI input, reworking and restructuring documentation (including the initial conversion of the documentation to HTML), embedding the Quartz Composer environment within SuperCollider, serving for a time as the most active maintainer of the Mac OSX SC client (numerous additions to SC's Cocoa GUI kit, etc.), and various other contributions too numerous to mention. Birmingham also acts as host for the dynamic online SuperCollider Users and Developers groups; within these groups Wilson can be seen regularly responding to specific programming questions raised by users from all over the world and also adjusting the SuperCollider program on a regular basis to meet their needs.

Beginning in 2006 in collaboration with Professor Jonty Harrison (Professor of Composition and Electroacoustic Music, University of Birmingham), and with funding from the AHRC, Wilson developed a suite of software – *BEASTmulch* System and *BEASTmulchLib* – which extend the SuperCollider environment to more easily support multichannel audio spatialisation, including massive multichannel setups, of which the 96-channel BEAST sound diffusion performing environment is one example.

In 2011 Wilson, with co-editors David Cottle (University of Utah) and Nick Collins (University of Sussex), issued *The SuperCollider Book* (MIT Press). The SuperCollider Book is regarded as the standard reference text, offering the definitive guide to the design, syntax, and use of the SuperCollider language. Wilson was lead editor and also co-authored two chapters, one on using SuperCollider as a composition environment, and one on multichannel techniques in SuperCollider.

**3. References to the research** (indicative maximum of six references)

(1) The *SuperCollider* program and environment, version 3.6 (http://supercollider.sourceforge.net/)
(2) BEASTmulch: http://www.birmingham.ac.uk/facilities/BEAST/research/mulch.aspx Produced as part of a £71172.57 AHRC funded research grant entitled *Development of an intelligent software controlled system for the diffusion of electroacoustic music on large arrays of mixed*

*loudspeakers.*

(3) *The SuperCollider Book*, ed. Scott Wilson, David Cottle and Nick Collins (MIT Press, 2011), 680pp. ISBN-10: 0262232693; ISBN-13: 978-0262232692 (favourable review in *Organised Sound* 18:1, April 2013) **[available from HEI on request]**
(4) Rethinking the BEAST: Recent developments in multichannel composition at Birmingham ElectroAcoustic Sound Theatre, Scott Wilson and Jonty Harrison, *Organised Sound* (2010), 15 : pp 239-250 **[DOI: 10.1017/S1355771810000312]**

**4. Details of the impact** (indicative maximum 750 words)

Through contribution to the ongoing development of *SuperCollider* program and particularly the production of the accompanying book in 2011, Wilson's research is **contributing to new methods of creative practice and the methods and practices of composers and performers throughout the world**. Downloads of the program since 2008 are currently at 230,285 from 177 countries, with sales of the book at 3090 [see source 1 below]. The book has received a very positive response from the *SuperCollider* community, in addition to being favourably reviewed in academic journals [source 2-4]. Wilson also maintains the two user group discussion lists (which are very active, with between 20-60 messages per day), and so has a direct impact on its members in this way. The extremely heterogeneous membership of the lists, which includes academics, popular musicians working in a variety of genres, music educators, researchers in related fields such as psychoacoustics or data sonification, sound artists, speculative music theorists, and experts in the history and culture of computer programming, gives some idea of the spread of interest in the program.

The program was the first to allow a great degree of flexibility in terms of the ability to modify musical algorithms in a straightforward way while they are running. It is used by both amateur and professional composers and performers of electronic music, and is both flexible enough and provides enough genre related features to be applicable to a variety of uses. This is particularly evident in the SuperCollider Symposia held since 2006 (when the first Symposium, arranged by Wilson, was held at Birmingham), and on four occasions since 2008; Middletown, Connecticut (2009, at Wesleyan University); Berlin (2010); London (2012), and Boulder, Colorado (2013). The Symposia, arranged by various members of the community not limited to academics, bring together users to discuss and perform using the SuperCollider program. They are international events, attracting over 100 people including performers and composers, as well as students, academics, and concert goers. Future events have been proposed for Tokyo, Japan, Mexico, and other locations [source 7, 8].

Since 2006, Wilson has developed the BEASTmulch extensions to the SuperCollider language. (This was initially an AHRC funded project with Professor Harrison as Co-Investigator.) These provide a class library, BEASTmulchLib, which provides facilities for building applications which specify and control large or small scale multichannel systems. It also brought some new spatialisation techniques (most notably Vector Base Amplitude Panning) to SC for the first time. A standalone application based on the library, BEASTmulch System, is now the concert software for BEAST, and has been used by BEAST in over 70 concerts in the UK and around Europe (Basel, Berlin, Copenhagen, etc.). It has also been downloaded numerous times and used for concerts and other purposes internationally (e.g. Canada, Germany, Mexico and around the UK) [source 5]. Some of the new approaches to and strategies for multichannel electronic music composition made possible by BEASTmulch are discussed in a general fashion in [source 4], thus exposing these ideas to a wider audience and raising the possibility of similar developments being added to other software and programming environments.

Since 2011, Wilson has developed another aspect of his SuperCollider research, as the organiser of a laptop computer ensemble – Birmingham Ensemble for Electroacoustic Research (BEER) – which performs regularly in Britain and demonstrates in a practical way the smaller-scale uses of SuperCollider [source 6]. BEER has performed in a variety of different contexts, ranging from bars and nightclubs, to a concert in the Bramall Music Festival, reaching audiences which include electronica fans, classical 'new music' listeners, and the scholars attending the Alan Turing congress recently hosted in Birmingham. In this way Wilson's research is having a direct impact

on the members of the ensemble and the audiences performed to. Wilson's activities with BEER have recently led to the development of a new SuperCollider library for networked music applications, tentatively called Utopia. This work helps interested SC users to make music with each other over wired and wireless computer networks [source 9].

**5. Sources to corroborate the impact** (indicative maximum of 10 references)


[1] http://sourceforge.net/projects/supercollider/files/stats/map?dates=2008-01-01%20to%202012-12-06

[2] Reviews of *The SuperCollider Book* by independent musicians:
http://www.linuxjournal.com/content/supercollider-book-review
http://hajos-kontrapunkte.blogspot.co.uk/2012/02/some-smalltalk-about-supercollider.html

[3] Reviews of the SuperCollider project at sourceforge.net (100% recommended)
http://sourceforge.net/projects/supercollider/reviews/

[4] Collated list of user comments about book from the Supercollider User Group. Some examples include:

[5] http://new-supercollider-mailing-lists-forums-use-these.2681727.n2.nabble.com/sc-book-is-out-tt6283800.html
http://new-supercollider-mailing-lists-forums-use-these.2681727.n2.nabble.com/Three-SuperCollider-Book-sample-chapters-now-available-plus-bonus-present-tt6312441.html#a6314280

[6] Notices of the book on the Internet:
http://electro-music.com/forum/topic-46086.html
http://stream.sonictruths.net/new-release-the-supercollider-book
http://kingeve.com/wordpress/?p=1307

[7] Supercollider User Groups:
http://www.birmingham.ac.uk/facilities/BEAST/research/supercollider/mailinglist.aspx

[8] Birmingham Ensemble for electroacoustic Research

[9] (BEER): http://www.birmingham.ac.uk/facilities/BEAST/research/Birmingham-Ensemble-for-Electroacoustic-Research.aspx.
See also http://scottwilson.ca/scottwilson.ca/News_and_Events/News_and_Events.html
http://www.mcld.co.uk/runningsc2012.pdf
http://supercollider.sourceforge.net/symposium/
https://github.com/muellmusik/NetMusicLib