

Making People Move:

Collaborative cross-domain real-time score generation and performance

Cambridge Dorkbot

Cambridge Makespace, February 25th 2015

Richard Hoadley

Digital Performance Laboratory, Anglia Ruskin University, Cambridge UK

v0.01

8th Feb 1963

Notation is a way of making people move. If you lack others, like aggression or persuasion. The notation should do it. This is the most rewarding aspect of work on a notation. Trouble is: Just as you find your sounds are too alien, intended 'for a different culture', you make the same discovery about your beautiful notation: no-one is willing to understand it. No-one moves.

Cornelius Cardew, from **Treatise Handbook**, 1971

A handwritten musical score on a single page. The score is composed of several staves and various musical notations. At the top right, there is a large, empty oval shape. Below it, the score begins with a treble clef and a key signature of one flat (B-flat). The notation includes a series of horizontal lines, some with notes and stems, and some with vertical lines. There are also several curved lines and a large circle containing a musical staff with notes. The score is written in black ink on a white background. At the bottom of the page, there are two empty staves.

Three research streams

1. algorithms (patterning)

2. physical computing

3. notation/representation

...linked by cross-domain expression and interpretation

Cross-domain expression?

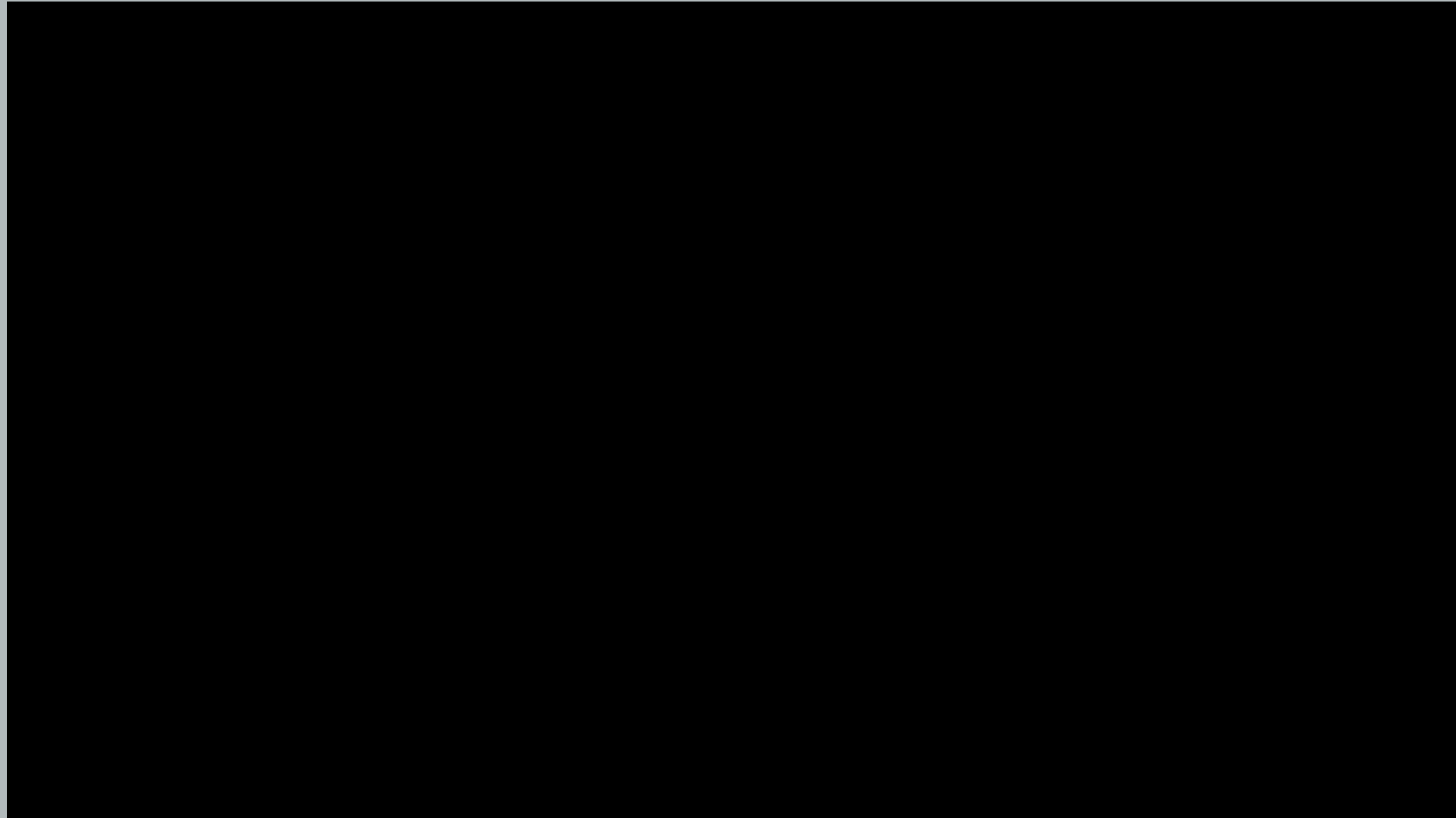
- Music is already cross-domain (as are all arts)
- It is formed of physical action to create patterns
- I'm not worried about what happens when those patterns are created today. As a composer, I suppose I rely on my judgement to help me decide whether I *like* a pattern or not.

Physical computing

NIMEs or not?



Laetitia Sonami *Lady's Gloves*



Marije Baalman *Wezen-Gewording* (2013)

Gewording (Becoming) is the first performance version where the link between physical and sonic gesture is explored during a live performance, combining movement of the body and live coding.



Imogen Heap *Me the Machine* (2014)



Imogen Heap - MiMu Gloves Demonstration, 13th December 2014



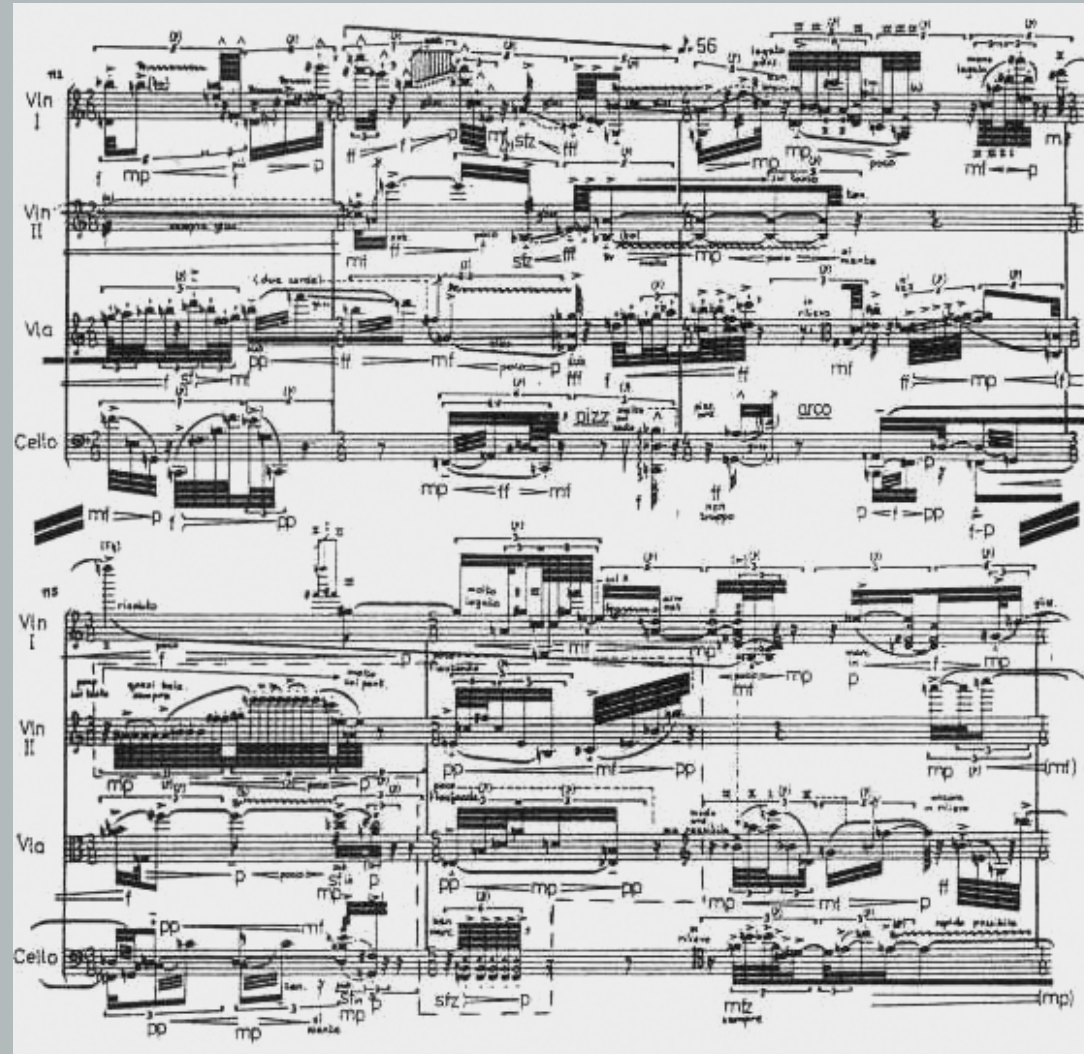
TEDxBRISTOL 2011 - CREATIVITY SESSION - IMOGEN HEAP

see particularly 7:45+ (violin bow)

Notation/representation

- is a complex semantic and graphic form of 'language'
- is not really suited to non-specialised environments
- presents many challenges concerning electronic implementation and display

Notation: complexity



A detailed musical score for a string quartet, showing multiple staves for Violin I, Violin II, Viola, and Cello. The notation is highly complex, featuring numerous dynamic markings (e.g., *mp*, *f*, *pp*, *sfz*), articulation marks, and intricate rhythmic patterns. The score is divided into two systems, with the first system starting at measure 56. The notation includes various musical symbols such as slurs, accents, and hairpins, indicating a high level of technical and expressive complexity.

Ferneyhough **Second String Quartet** (1980)

Notation: Mea culpa

Handwritten musical score for "Mea culpa" by Richard Hoadley. The score is written on a system of staves, including a string quartet and vocal parts. The tempo is marked as quarter note = 110. The score includes dynamic markings such as *mf*, *p*, *p sotto*, *mf sopra*, *f sopra*, and *tti*. The notation features complex rhythmic patterns, including triplets and sixteenth notes, and is written in a style characteristic of contemporary classical music.

Richard Hoadley **Four Archetypes** (1995)

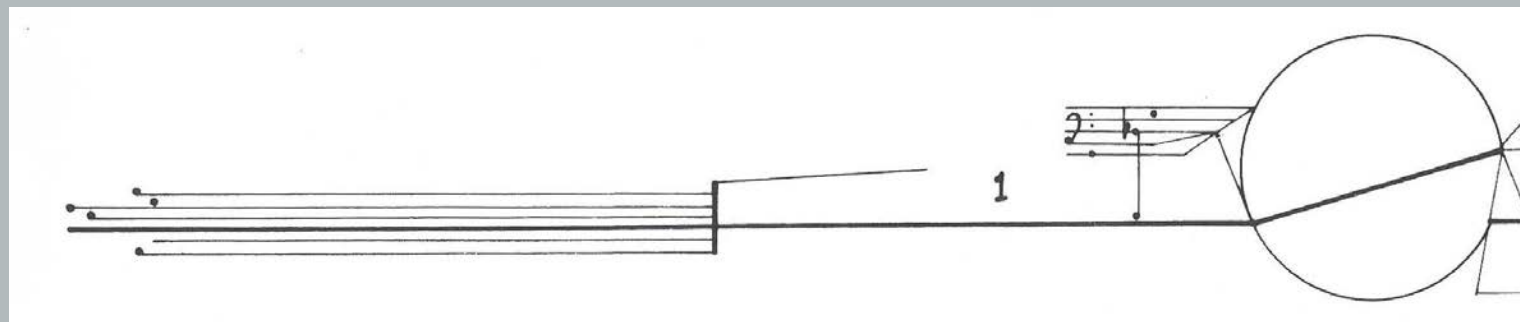
Graphic notations: Cardew

Cornelius Cardew: Octet '61

The image displays a handwritten musical score for 'Octet '61' by Cornelius Cardew. The score is organized into six numbered sections, each represented by a staff. Above the main score, six individual staves are numbered 1 through 6, each containing a unique graphic notation. These notations are: 1) a treble clef with a single note and a flourish; 2) a treble clef with a horizontal line; 3) a treble clef with a complex, dense graphic; 4) a bass clef with a single note; 5) a bass clef with a few notes; 6) a treble clef with a vertical line of notes. The main score below consists of two staves. The upper staff contains various graphic notations, including vertical lines, slanted lines, and clusters of notes. The lower staff contains a sequence of notes with dynamic markings (f, p) and articulation marks. The entire score is annotated with circled numbers 1 through 6, which correspond to the six numbered staves above. A '3P' marking is visible at the bottom right of the main score.

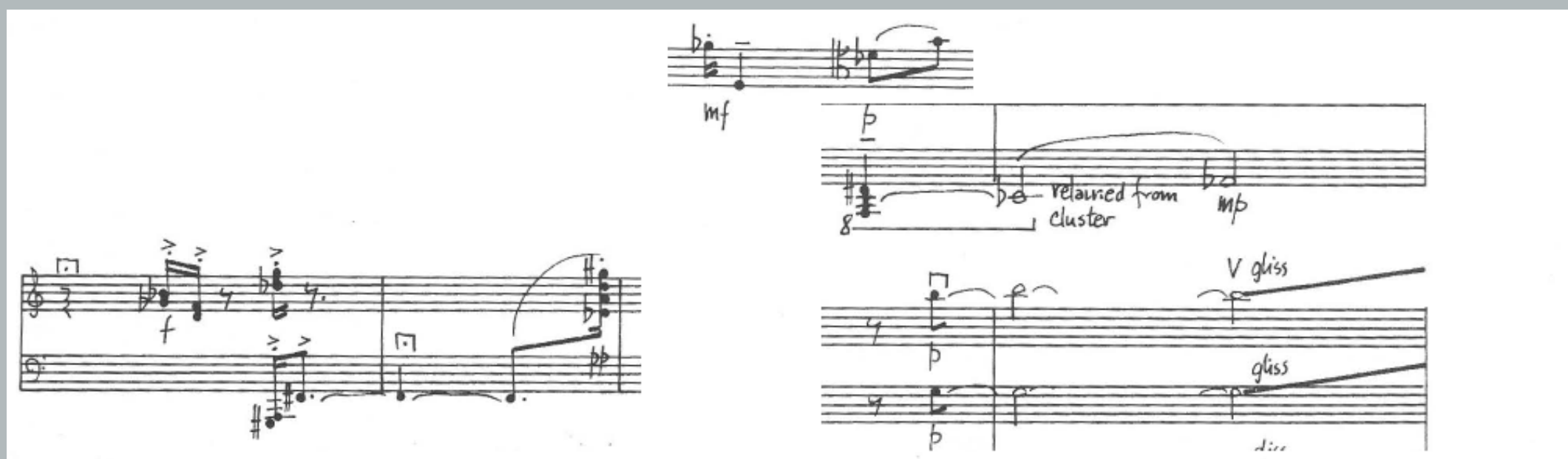
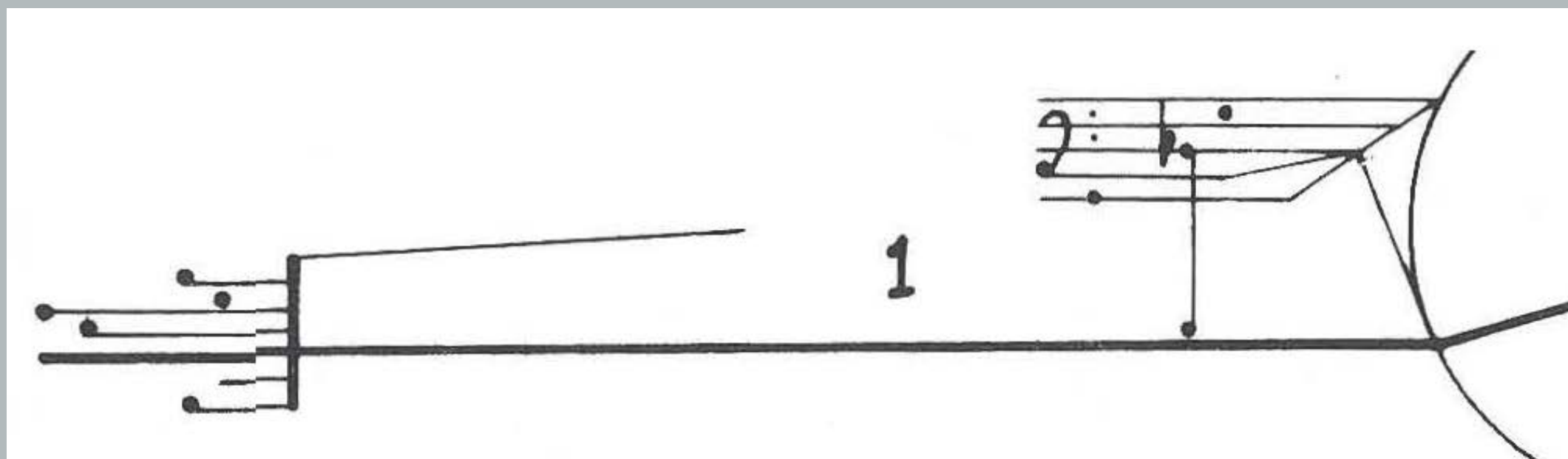
From Cardew **Octet 61** (1961)

Graphic notations: Cardew *Treatise* (1963) and *Bun No. 2* (1964)

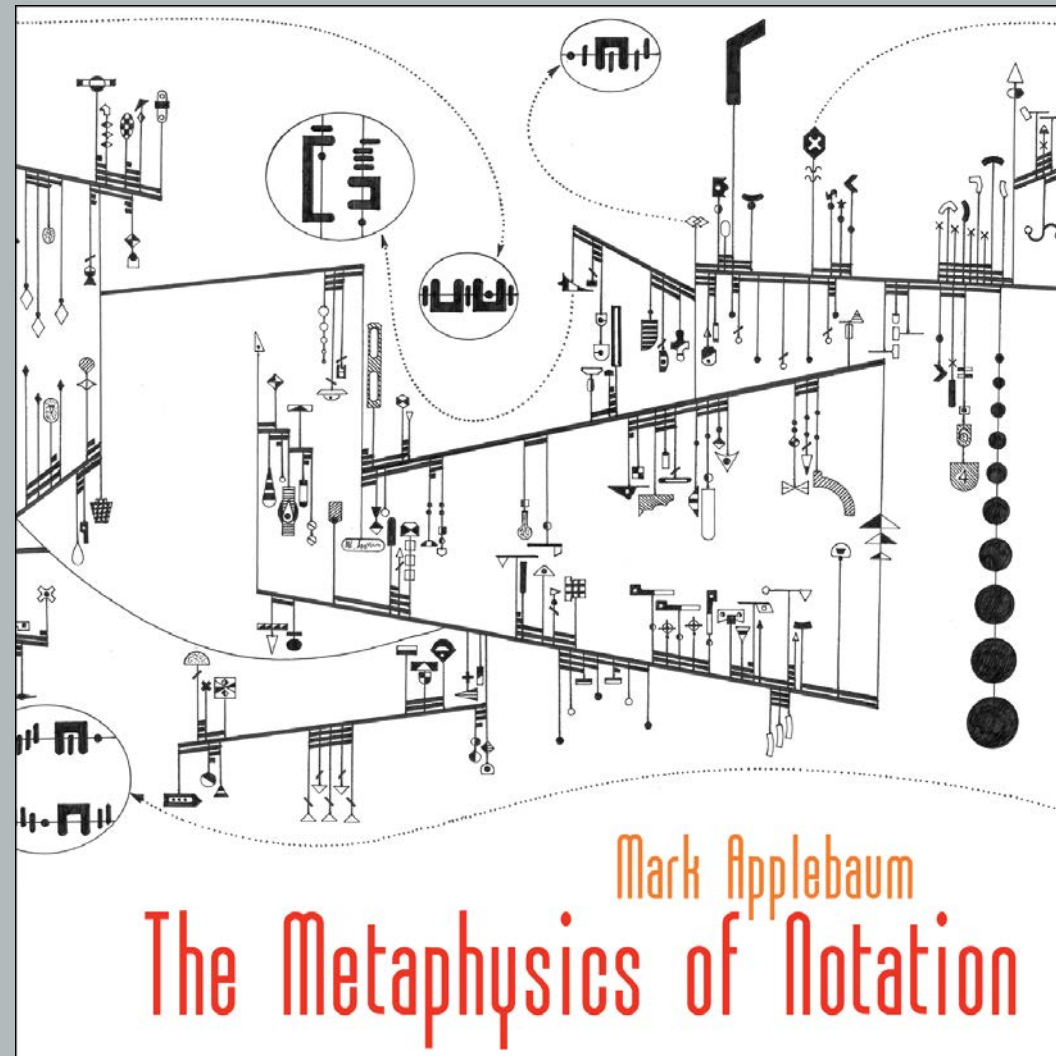


A page of a musical score for 'Bun No. 2' by John Cage. The score is written on multiple staves. The top staves are for Flute (Fl.), Clarinet (Cl.), Bassoon (Bs.), and Trombone (Tr.). Below these are staves for Cymbal (Cym.), Piano (Pno.), Violin I (Vln I), Violin II (Vln II), Viola (Vla.), and Violoncello (Vcl.). The score includes various musical notations, including notes, rests, and dynamic markings. A section of the score is labeled 'RICHTIG (1)'. The page number '3' is visible in the bottom right corner.

Detail from Treatise and Bun 2...



Graphic notations



From Appelbaum, **The Metaphysics of Notation** (2010)

Why pursue these lines of research?

- for me it offers the greatest chance of understanding the act of composition
- it unifies dots and signals: enriching electronic music with live performance and algorithmic patterning [quote]
- it enables the live synchronisation of algorithmic generation of both electronic and electroacoustic material and notation

- it allows the study of links between expressive domains: algorithm and physical gesture into live notation: which gestures have 'meaning' and which don't
- it utilises virtuosic performance and investigates liveness in music performance and improvisation
- it allows analysis of compositional processes through automation
- ...as a consequence and to clarify, it's a technique and a tool, just as these compositions are both pieces and experiments

and... String Sextet alternatives...

The image shows a handwritten musical score for Violin I and String Sextet alternatives. The score is written on five staves. The top staff is a grand staff with the instruction "poco ad lib, con licenza" written across it. The Violin I part is on the second staff, starting with the instruction "Vlno I" and "follow first round, ad lib.". The score is divided into four measures, each with a large letter 'J' above it. The first measure contains a melodic line with dynamics *p*, *mp*, and *p*. The second measure contains a melodic line with dynamics *f* and *mp*. The third measure contains a melodic line with dynamics *f*, *mp*, *mf*, *p*, and *mp*. The fourth measure contains a melodic line with dynamics *mp*, *p*, *mf*, *f*, and *mp*. The score includes various musical notations such as slurs, accents, and dynamic markings. There are also some handwritten annotations and arrows indicating relationships between the staves.

from... Birtwistle Verses for Ensembles (1968-69)

6

$\text{♩} = c.42$

Alto Fl.

B♭ Clar.

Cor Ang.

pppp

pp

ppp

pp

ppp

p

fff

pp < mp > pp

mp > pp > mp > pp

pp < mp > pp

pp < mp > pp

pp < mp > pp

pp < mp > pp

pp

mp

ppp

ppp

mp

p

fff

3/4

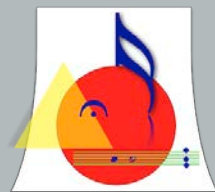
Live notation

We consider real-time music notation to be any notation, either traditional or graphic, which is created or transformed during an actual musical performance. However, the term has not been standardized, and various articles in this issue refer to real-time music notation using other terms, such as dynamic music notation, live scoring, virtual scoring, and reactive notation.

Contemporary Music Review, Vol. 29, No. 1, February 2010, p. 1, Preface: Virtual Scores and Real-Time Playing, Arthur Clay and Jason Freeman

The tools

- provide a structure for the generation of music and/or common practice notation as well as many arbitrary graphical elements
- facilitate communication between SuperCollider and INScore
- offer the beginnings of a more standard interface for physical mapping



and are located...

- <https://github.com/supercollider/supercollider>
- <http://inscore.sourceforge.net/>
- <http://rhoadley.net/inscore> (eventually...)

Performances

Gaggle, HCI conference, Cambridge, UK, 2009



Performances

Gaggle, Museums, interfaces, spaces, technologies, 2010



Performances

Calder's Violin, SuperCollider Symposium, London 2012



Performances

The Fluxus Tree, LIPAM, Leeds UK, September 2012



Performances

Quantum Canticorum, Museum of Modern Art, Barcelona,
June 2014



To display, or not to display, the notation?

Performances

Quantum Canticorum Demonstration, Natural History
Museum, London, June 2014



Performances

Semaphore, Cambridge, October 2014



NB for different performers

Peer comment and criticism

1. many comments asking about the possibilities of machine musicianship as a compelling reason for using real-time notation (imagination over reality)
2. possible difficulties in keeping track of one's place in the score
3. the feasibility of obtaining an 'accurate' and structured rendition due to lack of rehearsal

1. the 'fetishisation' of the notation (when displayed)
2. the dancer being 'caged' by the 'cone of the Kinect' (MSphobia?)
3. the 'conservative' nature of the music (old fashioned modernism? a reasonable point, maybe, and there are no stylistic predicates with the technology)

(performers involved do not tend to agree with the majority of these comments, nor were views expressed at Natural History Museum)

Forthcoming performances

How to Play the Piano with Philip Mead, 26th February 2015,
Exchanging Cultures Festival, de Montfort University, Leicester

Drawing Towards Sound with David Ryan, Guildhall/Trinity
Laban, 20th March 2015

video recordings of past performances are at **rheadley.net/**
[youtube](https://www.youtube.com/) and
rheadley.net/vimeo

Demonstration

Just in case:



Thank you

any questions?

contact:

research@rhoadley.net

this presentation is available at

<http://rhoadley.net/presentations>

as **ccde-s.pdf**