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GUEST EDITORS SHELLY KNOTTS AND NICK COLLINS
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DANCECULT: JOURNAL OF ELECTRONIC DANCE MUSIC CULTURE is a peer-reviewed, open-access e-journal for the study of electronic dance music culture (EDMC). Launched in 2009, as a platform for interdisciplinary scholarship on the shifting terrain of EDMCs worldwide, *Dancecult* houses research exploring the sites, technologies, sounds and cultures of electronic music in historical and contemporary perspectives. Playing host to studies of emergent forms of electronic music production, performance, distribution, and reception, as a portal for cutting-edge research on the relation between bodies, technologies, and cyberspace, as a medium through which the cultural politics of dance is critically investigated, and as a venue for innovative multimedia projects, *Dancecult* is the leading venue for research on EDMC.

COVER: THE YORKSHIRE PROGRAMMING ENSEMBLE (TYPE) LIVE
AT OPEN DATA INSTITUTE IN 2017. IMAGE SHOWS LAPTOP BAND MEMBERS
LUCY CHEESMAN, RYAN KIRKBRIDE, AND LAURIE JOHNSON FROM LEFT TO RIGHT.
PHOTOGRAPH BY JOANNE ARMITAGE, USED WITH PERMISSION..

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INTRODUCTION:

ALGORITHMIC ELECTRONIC DANCE MUSIC

— GUEST EDITORS' INTRODUCTION —

SHELLY KNOTTS AND NICK COLLINS

DURHAM UNIVERSITY (UK) / DURHAM UNIVERSITY (UK)

SHELLY KNOTTS develops performances and systems for technologically-facilitated improvisation exploring aspects of code, data and computer networks. She performs internationally, collaborating with computers and other humans. She is currently a researcher at Durham University, working on developing browser-computer music tools as part of the project Musically Intelligent Machines Interacting Creatively. In 2017 she was Leverhulme Artist in Residence at Newcastle University working on Molecular soundscapes with computational chemist Agniewska Bronowska. Previous research interests include the political practices implicit in collaborative network music performance practice; designing systems that play with particular data structures for algorithmic and improvised music creation; developing interfaces for improvisation. Her creative work has appeared on the Chordpunch record label, Absence of Wax net label and in *Leonardo Music Journal*. She has received commissions and residencies from national organisations. As well as performing at numerous Algoraves and Live Coding events, current collaborative projects include network laptop band OFFAL (Orchestra For Females And Laptops), and live coding duos ALGOBABEZ and [Sisesta Pealkiri]. In 2017 she was a winner of the BBC Radiophonic Workshop Oram Award for innovation in sound and music. Web: <<http://datamusician.net>>.

NICK COLLINS is a Professor in the Music Department at Durham University and a specialist in computer music. He has researched extensively in algorithmic composition for electronic and popular music, as well as artificial intelligence for live music performance. Recent funded projects include Musically Intelligent Machines Interacting Creatively exploring web browser based machine listening and learning, a Sky Arts television documentary project to computer generate a new musical theatre work, a Leverhulme Trust Artist in Residence grant for the Durham music department involving the development of emotion-aware concert systems, and a sub-project for the AHRC Transforming Musicology grant on electronic music audio corpus analysis. He has published over 80 research papers since 1999 including a much downloaded 2012 *Computer Music Journal* article on his Autocousmatic software for automatic electroacoustic music creation. He has reviewed for major conferences, journals and research councils in the field, and been external examiner for 12 PhDs from music composition to music psychology. He co-edited the *Cambridge Companion to Electronic Music* (Cambridge University Press 2007) and *The SuperCollider Book* (MIT Press, 2011), wrote the *Introduction to Computer Music* (Wiley 2009) and co-wrote *Electronic Music* (Cambridge University Press Introductions series, 2013). Practical electronic dance music experience extends from many nightclub laptop gigs to the creation of automated EDM tools such as BBCut (Csound, SuperCollider, iPhone) and the infno software. Web: <<http://composerprogrammer.com>>.

Algorithms are at the heart of the virtual studio software applications underwriting so much contemporary dance music, but are normally the prior preserve of music engineering teams rather than musicians. This special issue, however, engages with algorithms as musical material, and especially with music which is inherently founded on computer

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programming technique. A recent manifestation of this is the algorave, an explicit site of live algorithmic electronic dance music (EDM), produced through such means as on stage computer programming (algorave.com). Creators of EDM have vast amounts of software at their disposal, including specific musical programming languages; modern digital audio workstations now often include the capacity to utilise a programming language, such as Python and Max/MSP embedded within Ableton Live, or Logic's MIDI Scriptor.

The history of algorithmic techniques within mainstream and experimental fringe dance music predates the coining of the term algorave (Collins and McLean 2014). Powerful computer music coding environments have been co-opted for use in club contexts, by such well known figures as Autechre (Max/MSP), BT (Csound, Composer's Desktop Project), Cylob, Aphex Twin (SuperCollider) and Holly Herndon (Chuck), amongst many others. Some artists have written their own software from scratch, such as the generative gabba-techno artists slub, or commissioned others to supply it, as with Coldcut and the VJamm and Coldcutter programs.

Research in this area extends from the introduction of new algorithmic techniques for the production of dance music, to the computational analysis of existing EDM, via critical appraisal of algorithms in the wild. Live realtime systems, as well as offline studio software, have been developed. An increasingly algorithmically literate culture will see increasingly algorithmically literate music, and the rise of music-oriented computer programming has great implications for future directions within EDM.

The articles collected in this issue consider algorithmic EDM from diverse perspectives. They provide cultural critique, assess its use as a teaching aid, describe individual studio and performance practices and explore views on the confluence of computer programming and music making, with live coding (Collins et al. 2003) a frequent, if not compulsory, locus. These diverse contexts reflect the placement of algorithmic EDM both within academic study and as contemporary artistic practice with a globally distributed scene. The algorave has become a banner for performance events which include live coding and related practices, with some practitioners also academics, but by no means all.

This issue's longer papers give us an in-depth look at the development of two separate performance systems; present research on gender in the algorave scene; and consider the importance of patterns in algorave with respect to wide ranging historical links to weaving and classical antiquity. The From the Floor section includes two shorter papers focusing on algorithmic EDM in the context of undergraduate education and live coding in Mexico; we also feature a number of artist statements, to give insight into individual practices.

Alex McLean, Giovanni Fanfani and Ellen Harlizius-Klück's article brings together three seemingly disparate fields, to find deep connections between Ancient Greek poetic metre, weaving and the patterns manipulated in the TidalCycles live coding programming language. Alongside many examples of rhythmical pattern across their triumvirate, they argue for a Luddite perspective on the algorave movement itself, as a surprising reaction to new technological development.

Joanne Armitage questions the perceived openness of the algorave scene through a series of interviews with women about their experiences as part of the algorave community. She

suggests the dominance of technical discourse and the bias towards technology developed by men is a challenge for diversity in the scene. She argues changing narratives in the community alongside female only learning and support spaces and female-centric tech development as possible strategies for creating more diverse futures for algorave.

Artiin is an interactive computer music system operating within EDM styles, intended both for live performance and studio music generation. Its author Richard Savery's article provides an overview of its capabilities and technical basis, and evaluation through six DJs, though the system and its source code (for Max for Live) is not currently publicly released.

Ryan Ross Smith and Shawn Lawson describe the development of their audio-visual performance systems over several years and how their creative ideas evolved in response to changing contexts and working methods. Amongst other projects their collaboration resulted in *The Force*—a live coding system for generative visuals.

The *From the Floor* contributions include Lee Cheng's case study where a university level teaching module uses live coding as a method to teach EDM styles and introduce students to computer music practices.

Marianne Teixido, Emilio Ocelotl and Luis N. Del Angel chart the development of the algorave band RGGTRN, who foreground Latin American dance music styles in their performances. In developing their collective practice they came to recognize and problematize gendered labour practices in Mexican algorave contexts, and the lack of visibility of Mexican algorave performers in the broader international scene. They explain how their working practices and aesthetics have evolved in response, to ensure a more equal distribution of input.

Renick Bell discusses limits in algorithmic EDM and the technical directions he is pursuing to lessen them. He also points to the limits of genre norms in EDM contexts, and the challenge of stretching audiences to accept music at the boundaries of convention.

Shelly Knotts and Joanne Armitage formed the band ALGOBABEZ to disrupt gendered tech spaces. They describe how the duo performs gender, contributes to diversify the algorave scene (musically and demographically) and intersects with their academic work, developing performance projects that consider the body in algorithmic performance.

For Alexandra Cardenas, live coding bridges artistic, social and political thought, foregrounding principles including freedom, transparency and inclusion. She travels the world teaching and performing as a live coder and sees teaching live coding as a tool to develop diverse communities through democratising technology and culture.

Chris Kiefer reflects on his experiences combining code with new musical interfaces. He explains the difficulty of designing programming systems and musical controllers that provide intuitive ways of combining the two modes of working.

Esteban Betancur developed a library for flexible syntax design in live coding language Chuck, in response to the challenges of teaching live coding and developing an algorave scene in Colombia. He highlights the importance of syntax to performers and audiences, and how the dominance of English language in programming is a challenge for code literacy in the Latin American context.

THE FUTURE OF ALGORAVE

The algorave scene embodies an intersection of tools, community, practice and education. In charting their experiences with Algorithmic EDM, algorave practitioners frequently mention the feeling of “freedom” that live coding gives them, with Chris Kiefer highlighting how the curiosity of audiences makes it easier to experiment, and Alexandra Cardenas discussing the freedom to travel when your instrument is a laptop. Algoraving has made musicians of computer scientists and computer scientists out of musicians, encapsulating the ability of computer music to transcend disciplines.

The computing machinery brought to bear on dance music production will only get more intense, with new currents in artificial intelligence research, such as deep learning, applied to larger and larger corpuses of example audio material. Hopefully, though not inevitably, computer listening analysis will take place with better and better simulation of human musical understanding. Machine listening is familiar to electronic dance musicians from such examples as the virtual DJ tool Traktor’s automatic track alignment, or Logic’s Flex Pitch tool for adjusting pitch contours. Academic music engineering has tackled such topics as beat box tracking as user interface frontend (Kapur, Benning and Tzanetakis 2004), automatic mash-up generation based on detection of effective cut and transition points (Davies et al. 2013) or the prior analysis of a corpora of EDM before concert generation based on the trained model (Eigenfeldt and Pasquier 2013). Since machine listening and machine learning facilities are now so easily available as libraries for programmers, we would anticipate more, and more significantly automated, algoravethms in future work.

Indeed, as long as computers hold sway within EDM production, algoraves will have the opportunity to exist as a subversive social commentary on computing and dance music, even if the fine details of those algorithms on public display remains a more niche undertaking. Unleashed from Pandora’s boom box, the Algorithmic Age demands a pumping soundtrack.

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