David Burraston – Curriculum Vitae

David Burraston is a UK born generative artist/scientist involved in technology and electronic music since the late 1970s. He had an innovative role in the foremost UK telco's R&D laboratory in diverse areas such as Artificial Life and Virtual Reality. He has worked with collaborators as diverse as the MIT Media Lab, Aphex Twin, and the Australian Broadcasting Corporation. Although self taught in the areas of music composition/technology, chaos and complex systems, he is recognised as a leading practitioner/theorist in the field of generative music, producing both peer reviewed publications and musical compositions. He is also a peer-reviewer for the Leonardo Journal, Leonardo Music Journal, Computer Music Journal and on the editorial board of Leonardo Transactions. In January 2008 Dave became a member of the Australia Research Council funded initiative COSNET (Complex Open Systems Research Network).

He has consistently been a top scholarship candidate in computer science at undergraduate and postgraduate level. His PhD thesis developed and applied fundamental new concepts, arising out of generative music practice, to a key problem in complex systems. Publisher VDM Verlag accepted his PhD for publication as a monograph in 2009. The international peer reviewed Leonardo Abstracts Service (LABS) voted his PhD top among all submitted abstracts in 1st half of 2007 because of its special relevance to art/science. Also in 2007 he received a complimentary copy of Wolfram Research's new Mathematica 6 software. His current work is aimed at tackling more key questions in complex systems from a creative practice perspective, drawing inspiration from natural and artificial complex systems. These key questions address for example the definition of randomness, structure and high level descriptions of information processing in complex systems. Dave has maintained his own independent analogue/digital research music studio called Noyzelab since 1981 (www.noyzelab.com). He has performed music / video sets around the world at a wide variety of events, working on many collaborative projects with both artists and scientists.

Contact for enquiries, gig/performance bookings, correspondence :

Email : dave@noyzelab.com / Tel : +61 2 6943 6222
PO Box 311, Cootamundra, NSW 2590, Australia.

EDUCATION

Creativity & Cognition Studios (CCS), University of Technology, Sydney, Australia (2003 - 2006) : PhD Thesis in Computing Science : *Generative Music and Cellular Automata* (The 1st PhD completed at CCS. Thesis completed a year early : 3 years / 6 semesters full time)
Nottingham Trent University, UK (1990-1993) : BSc. 1st Class (Hons) in Computing Systems Thesis : *Isolated Word Detection in a Noisy Environment* (Highest mark in graduating year and the only 1st class awarded)

AWARDS

- 2007 PhD abstract voted top in 1st half of 2007 by the international peer-reviewed Leonard Abstracts Service (LABS) due to its special relevance in art/science. Invitation to write a paper on the thesis for Leonardo Journal. Invitation to have thesis abstract published in Leonardo Electronic Almanac.
- 2003 – 2006 International Postgraduate Research Scholarship covering travel, fees and stipend to study for PhD at UTS, Sydney, Australia
- 2000 Year of the Artist award from East of England Arts. A two-month online collaborative music video project with Peter Green and video artist Amanda Terrington
- 1990 – 1993 Minor Award from British Telecom of fees and stipend, to take 3 years leave from work in full time study for BSc (Hons) Computing Systems

PEER REVIEWED PUBLICATIONS

Burraston, D. (2007) Fundamental Insights on Complex Systems arising from Generative Arts Practice. *Leonardo* Vol 40 (4) pp372-3.

Burraston, D. (2007) Generative Music and Cellular Automata. PhD Thesis Abstract. *Leonardo Abstracts Database (LABS)* http://leonardolabs.pomona.edu

Burraston, D. (2007) Generative Music and Cellular Automata. PhD Thesis Abstract. Leonardo Electronic Almanac Volume 15, Number 9 - 10 http://leoalmanac.org ISSN #1071-4391

Burraston, D. (2006) *Generative Music and Cellular Automata*. PhD Thesis. Creativity and Cognition Studios, University of Technology, Sydney, Australia.

Burraston, D. and Martin, A. (2006) Digital Behaviours and Generative Music, "Wild Nature and the Digital Life" Special Issue, *Leonardo Electronic Almanac* Vol 14, No. 7 – 8

Burraston, D. (2005) Structuring Cellular Automata Rule Space with Attractor Basins. *Proceedings of Generative Arts Practice Symposium 2005*. pp21-40

Burraston, D. (2005) Babelitis. *Proceedings of Generative Arts Practice Symposium 2005*. pp144-149

Edmonds, E, Brown, P and Burraston, D (Eds). (2005) *Generative Arts Practice. Proceedings of Generative Arts Practice Symposium 2005*. Creativity & Cognition Studios Press.

Burraston, D. and Edmonds, E. (2005) Cellular Automata in Generative Electronic Music and Sonic Art : A Historical and Technical Review. *Digital Creativity* 16(3) pp165-185

Burraston, D. (2005) Variety, Pattern and Isomorphism. *Proceedings of the Third Iteration Conference*. Monash University. pp107-117

Burraston, D. (2005) Composition at the Edge of Chaos. *Proceedings of the 2005 Australasian Computer Music Conference*. (Brisbane, July 2005). pp27-35

Burraston, D. (2005) One Dimensional Cellular Automata Musical Experiments with Max. *Proceedings of the11th International Conference on Human-Computer Interaction*. HCI International. **(INVITED)**

Burraston, D. and E. Edmonds. (2004) Global Dynamics Approach to Generative Music Experiments with One Dimensional Cellular Automata. *Proceedings of the 2004 Australasian Computer Music Conference*. pp29-38

Burraston, D., E. Edmonds, D. Livingstone, and E. Miranda. (2004) Cellular Automata in MIDI based Computer Music. *Proceedings of the 2004 International Computer Music Conference*.

Burraston D M, Hollier M P and Hawksford M O. (1997) Limitations of dynamically controlling the listening position in a 3-D ambisonic environment, *Audio Engineering Society Convention* 102, Preprint Number: 4460

Hollier M P, Rimell A N and Burraston D M. (1997) Spatial audio technology for telepresence, *BT Technology Journal*, 15, No 4, pp33-41

Burraston, D. (1993) *Isolated Word Detection in a Noisy Environment*. BSc Thesis, Nottingham Trent University, UK

LETTERS

Burraston, D. (1997) Saving Roland MC4 data to computer. *Sound On Sound* Vol.12 No.10. August

PROFESSIONAL EXPERIENCE

2003 - Present

- Invited as peer-reviewer for Leonardo Music Journal (MIT Press) (2009)
- Member of COSNET (Complex Open Systems Research Network) (2008)
- Co-founder of The WIRED Lab, NSW, Australia (2007)
- Invited as a Still Water Fellow at University of Maine, USA (Nov 2007)
- Invited as peer-reviewer for Leonardo Journal (MIT Press)

- Invited as peer-reviewer for Computer Music Journal (MIT Press)
- Invited on the Editorial Review Board for Leonardo's Transactions
- Invited as a Visiting Researcher at CCS, University of Technology Sydney (UTS)
- Founding Partner of the EMF Institute (www.emf.org)
- PhD International Student Scholarship at Creativity & Cognition Studios (CCS) 2003 – 2006
- Invited as peer-reviewer for Creativity & Cognition 2007 Conference
- Edited proceedings, peer-reviewed papers and assisted in organization of Generative Arts Practice Symposium 2005 at UTS
- Presented invited paper at HCI International Conference, Las Vegas, USA 2005
- Featured presentation on generative music at the ACID Speculation and Innovation Conference at Queensland University of Technology in Brisbane, Australia 2005
- Invited guest lectures at UTS and University of Sydney on Data Sonification, Generative Systems and Max/MSP/Jitter 2004
- Lecturing and performing at numerous art/tech festivals in Australia

2001 – 2003 Self Employed

- Part-time lecturing in Multimedia at Nottingham Trent University, UK, 2002.
- Generative music/video production and performance independently around the world.
- Web site design and construction.

1993 - 2000 Managerial/Professional Grade at BT Research Labs (Teleworking 1998 – 2000)

- Design and presentation of a wide variety of concept demonstrators in futures research. Often presented to board level managers and once at the Royal Society in London.
- Consultancy on algorithmic music, digital audio and MIDI.
- Supervising undergraduate/graduate (BSc/MSc) industrial placement students at BT Labs.
- DSP, spatial audio, sound synthesis and MIDI systems in virtual / artificial life environments using commercial and custom built hardware.
- Data sonification, digital audio sampling and editing.
- *Certified IEE courses* : Intro to DSP, Digital Filter Design, Intro to DSP processors

Two notable projects :

Technology transfer of Artificial Life system (ALIVE) from MIT Media Lab. The ALIVE system was used as part of the MIT Media Lab 10th Anniversary, becoming the first trans-Atlantic Artificial Life link up. Participants included Douglas Adams and Professor Nicholas Negroponte. Many professional demonstrations given worldwide to BT customers, senior management, BBC Tomorrows World and musician Peter Gabriel.

BT Portal was one of the first Virtual Reality sites on the web, a large project with myself and four other people. As result of my involvement I was invited to attend the round table at the first Virtual Reality Modelling Language (VRML) conference at University of California San Diego's Supercomputer Centre in 1995.

1981 - 1990 BT (British Telecom)

- Apprentice Technician : 3 Year BT apprenticeship in telecommunications and electronics.
- Technician : Transmission and microprocessor systems. Analogue and digital electronics.

COMMISSIONS

2008 by Alan Lamb / WIRED Lab as Artist/Scientist in Residence
2008 by Chris Mann for a sound piece for his website (in preparation).
2007 by ABC Classic FM for an electronic music composition *Monteverdudley* based on Monteverdi's opera *L'Orfeo* with Sarah Last.

2006 by Wagga Space Program for a collaborative installation piece *Loco-motivus Sleeper Carriage* with Garry Bradbury, aboard an antique train moving through the Australian landscape.
2005 by Sydney architect Dale Jones Evans to compose generative music for a video piece forming part of his invited Masters Thesis at RMIT, Melbourne, Australia.
2002 by UK based pioneering electronic composer Richard D James (Aphex Twin) to build custom DSP hardware.

MUSIC / DIGITAL MEDIA PUBLICATIONS (aka Dave Noyze)

Noyzelab Website : www.noyzelab.com (Music, video, data and papers in pdf format)
Automata 48, Dave Noyze, Cataclyst CD CLYST003 www.cataclyst.com (2008)
Generative Compositions 1998–2006, Dave Noyze, Cataclyst CD CLYST001 www.cataclyst.com (2008)
Land Down Under, Dave Noyze, Can Buy Me Love Vol 2 compilation CD, CBML2 (2006)
A Roaming We Will Go, Dave Burraston & Peter Green, Strings & Things compilation CD, Lo Editions/BMG Zomba LC 4369 (2005)
Out of Memory, Dave Noyze, Sevcom Edition CD album, www.sevcom.com (2005)
A Circle of Code 1 North East, Dave Noyze, The End of the Fear of God compilation CD, Tochnit Aleph 048 (2004)
Generative Music & Cellular Automata, Dave Burraston, SPARKS compilation DVD, Creativity & Cognition Studios Press (2003)
Automata, Dave Noyze, Beta Bodega Coalition, compilation CD RB001 (1999)

PERFORMANCE / EXHIBITION / INSTALLATION (aka Dave Noyze / Bryen Telko)

Stellular Taught on Ohm Ee. Dave Burraston, Liquid Architecture Festival, Australia 2009 (in preparation)
Stellular Taught on Ohm Ah. Dave Burraston, Dwellingup Arts Lab, Australia 2009 (in preparation)
Wogarno Wires. Dave Burraston and Alan Lamb, Tura Sounds Outback, Australia 2008
WIRED Lab. Dave Burraston and Alan Lamb, Cootamundra Arts Centre, Australia 2008
Loco-motivus Sleeper Carriage. Garry Bradbury & Dave Noyze. unsound06, Wagga Space Program, Australia 2006.
Generative Compositions. Dave Noyze. Liquid Architecture Festival, Sydney, Australia 2006
Generative Compositions. Dave Noyze. Big Day Out Festival, Sydney, Australia 2004 – 2006
Generative Compositions. Dave Noyze. Dual Plover Bradbury Album Launch, Sydney, Australia 2006
Acorn. Dave Burraston. Australasian Computer Music Conference, QUT, Brisbane, Australia 2005
Acorn. Dave Burraston. Third Iteration Conference, Monash University, Melbourne, Australia 2005
Babelitis. Dave Noyze. Generative Arts Practice Symposium, UTS, Sydney, Australia 2005
Generative Compositions. Dave Noyze. Electrofringe Festival, Newcastle, Australia 2003 - 2005
Fathom. D. Burraston & A. Martin. Sonic Connections, University of Woolongong, Australia 2004.
Bang Lassie. Dave Noyze & Wade Marynowsky. Disorientation event series, Sydney, Australia 2003
Bit Player. Dave Burraston, Nine digital prints of CA data visualisations for music composition, forming part of SPARKS Exhibition, Creativity & Cognition Studios & AMP Building, Sydney, Australia 2003
Storm in a Mandelbrot NOT SET. Bryen Telko. Fonicphist, Hull Time Based Arts, Hull, UK 2002
Self Cellar Ramor at Knee Level. Bryen Telko. Fonicphist, Hull Time Based Arts, Hull, UK 2001

BETA TESTING

1993 for the Waldorf Microwave music synthesizer.

2005 onwards for DDLab (Discrete Dynamics Laboratory) a specialised tool for examining cellular automata and other discrete networks. I regularly receive intermediate updates / source code from the author Andrew Wuensche (www.ddlab.org).

TECHNOLOGY SKILLS

Music : ACToolbox, ArtWonk, Logic Studio, NI Komplete, IRCAM Open Music, Peak, Metasynth, Max/MSP/Jitter, Scala, Symbolic Composer, Supercollider, (familiarity with most music software)

Scientific : Mathematica 6 (complimentary copy from Wolfram Research), DDLab, Labview, Matlab

Platforms : Acorn RISC, Apple Mac, Windows PC and Silicon Graphics.

Languages : C, C++, Assembler, BASIC, LISP

Misc Packages : Dreamweaver, Freehand, Office, Photoshop, Final Cut Pro

In addition I have built custom hardware/software for Analog Devices and Motorola DSP's, Parallax microcontrollers, and discrete analogue and digital equipment.

INTERESTS

Bush walking, reading (mainly non-fiction), travelling and operating a self funded electronic music studio "Noyzelab" since 1981. Noyzelab contains an extensive variety of electronic music instruments both analogue and digital, including a prototype modular synthesizer built to nuclear physics lab spec by Hinton Instruments in 1975, the only one of its kind in the world. Besides electronic music, other musical interests are works for harpsichord (and related keyboards) of all periods and contemporary music composition.

PAPERS IN PREPARATION (currently as sole author)

Complex Systems Journal : Cellular Automata Rule Space Structure : A Generative Music Perspective. (accepted, under revision)
Complexity Journal : brief communication of thesis results (under review)
Leonardo Electronic Almanac : PhD abstract **(invited)**
Leonardo Journal : Cellular Machinations I (accepted)
Leonardo Journal : Cellular Machinations II **(invited)**
Leonardo On-Line Bibliography : Generative Music and Cellular Automata (accepted)
Leonardo Journal, Transactions column : one page abstract/info about the on-line bibliography (in progress for submission)
Leonardo Book Series : Unknowable Determinism in Music (under review)
Computer Music Journal : Letter to editor - Errors in CMJ cellular automata papers (in progress for submission after personal communication to the editor in 2007)
Computer Music Journal : Tutorial on cellular automata (in progress for submission)
Computers & Graphics (Chaos & Graphics section) - Cellular Automata Rule Space (in progress for submission)

BOOK IN PREPARATION

Burraston, D. (2009). Generative Music and Cellular Automata, VDM Verlag. (Publication of PhD thesis, expected publication date : June 2009)

THE FOLLOWING PAGE CONTAINS MY PHD EXAMINERS REPORT BY SANTA FE INSTITUTE COMPLEX SYSTEMS PIONEER ANDREW WUENSCHE

Generative Music and Cellular Automata (PhD. Thesis)
by David M. Burraston

report/review by Andrew Wuensche
May 2006

Cellular automata dynamics are deterministic yet unpredictable. They form seductive patterns ranging from order to complexity to chaos, and emergent structures/particles that interact with computational abilities. Cellular automata are logically/mathematically deep in the sense that surprising correlations turn up everywhere one cares to look, and are only incompletely understood by theorists, though the underlying system is very simple. In fact the study of cellular automata relies on "experimental mathematics", impossible without computers.

This makes cellular automata dynamics an ideal complex system for transforming into experimental art and especially music, but not just anyhow – an appreciation of theory is required to navigate the vast space of rules and to coax a subjectively pleasing result.

Burraston has boldly plumbed the depths of cellular automata theory, its state-of-the-art, and has come to grips with it (including my own contribution to the field, which is gratifying - of course). On top of that he has discovered something entirely new and highly original, a correlation linking state-space and rule-space in attractor basins, which gives him hitherto unprecedented power over the selection of cellular automata rules for generative music. Thus he can find sets of rules that are diverse in behaviour yet also intimately related, because the rules themselves are generated by a cellular automaton. This insight is publishable in its own right in a theoretical complex systems journal.

Burraston has integrated these cellular automata insights with methods for transforming abstract patterns into generative/experimental sound or music. He is clearly a master in these methods which he has fully described and applied on the patterns generated by cellular automata, with results and examples provided. I am not a musician but I do recognize intriguing qualities in the generative music recordings. A critique of the recordings by musicians would be interesting, but probably not relevant to the thesis itself.

The thesis qualifies on all counts of the university's "Notes to Examiner of Thesis";