

## INSIDE THE MUSICIAN: GHOST FREQUENCY

by Cameron Undy\*

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*This is part of the Music Trust's series "Inside The Musician". It appeared on October 31, 2020 in "Loudmouth" and can be read there at this link*

*<https://musictrust.com.au/loudmouth/inside-the-musician-cameron-undy-ghost-frequency/>*



*Cameron Undy: diverse musical experiences in jazz, rock, funk, afro-beat, dance and world music...PHOTO CREDIT GORDON UNDY*

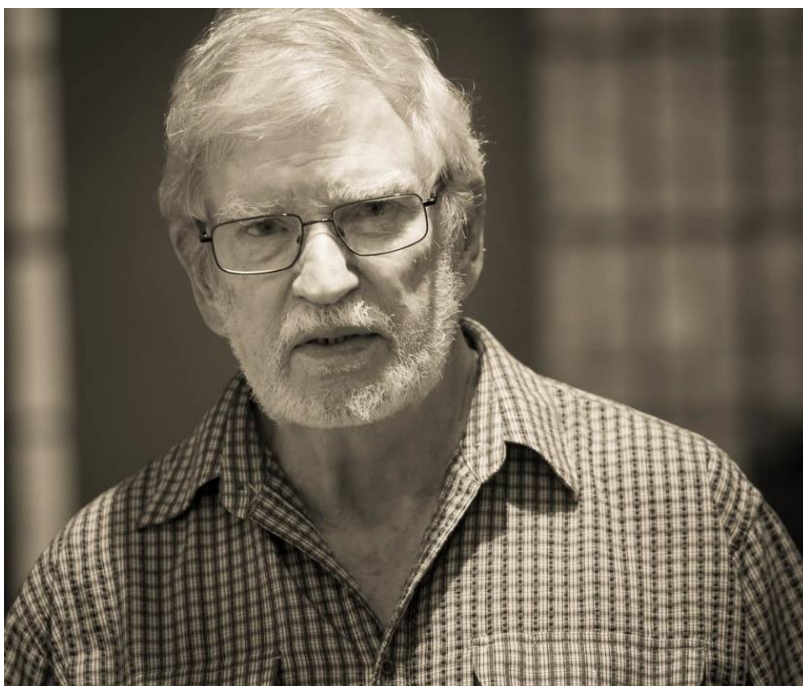
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*\*Cameron Undy carved out a career as a bassist in the 1990s in Australia playing with many luminaries of the day including Mike Nock and James Morrison. He was co-founder and inaugural president of the Jazzgroove Association. In the 2000's he travelled and performed throughout Europe with the 'Nu Jazz' wave of artists, returning in 2004 to co-found Venue 505, where he was director and artistic curator. His music draws on diverse musical experiences in jazz, rock, funk, afro-beat, dance and world music. In recent years he has played with legendary American saxophonist Pharaoh Sanders, the Australian icon Paul Grabowsky, and world-wide number one selling songwriter Passenger. The Los Angeles-based electronic music producer Mark de Clive Lowe released his album "Bone" in December 2016 to rave reviews. He is currently a PhD candidate at the University of Western Sydney working with Professor Roger Dean and Dr Andrew Milne, providing rhythm generation for the Musicker Project, involving machine learning and deep learning, at the MARCS Institute for Brain and Behaviour.*

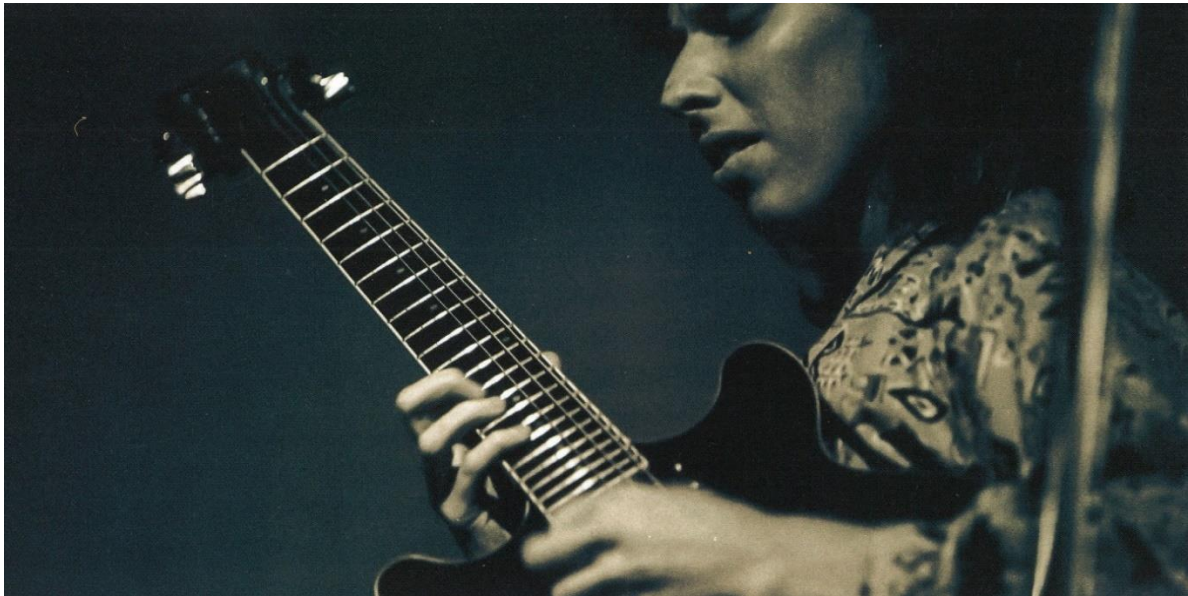
I was born to a mathematician dad and a librarian/arts scholar mum. Somehow I wound up being a musician. I remember my dad saying that if I wanted to be a musician I would need to be bloody good at it because it was a hard life. My mum cried when I told her I would live in the gutter if it meant I could be a musician (boys can be pretty insensitive to their mums). Thankfully my single-mindedness meant that all I did was practice, listen, talk and play music, and I became pretty good.



*My mum Lyndell Undy (above), a librarian/arts scholar, pictured in 2016, and my dad Gordon Undy (below), a mathematician... LYNDELL PHOTO CREDIT GORDON UNDY; GORDON PHOTO CREDIT LEONARD METCALF*



My older sister Fiona played the guitar and drums. She was extremely clever and taught me everything I needed to know about harmony/scales/rhythms, playing the guitar. I heard Charlie Haden play the double bass and my life changed forever! I mowed lawns, washed cars until I could buy a double bass. All my heavy metal records got ditched in favour of Ornette Coleman, Miles Davis, Keith Jarrett and so many more. Jazz, contemporary classical, American funk, African and Afro-beat music became food.



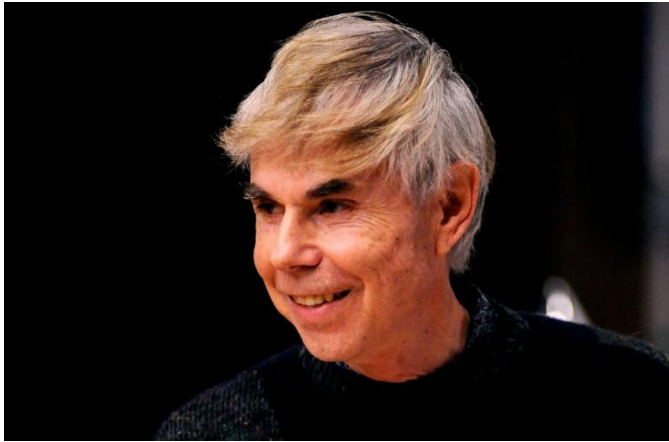
*My older sister Fiona Undy, who played the guitar and drums. She taught me everything I needed to know about harmony/scales/rhythms, playing the guitar... PHOTO CREDIT TOMAS POKORNY*



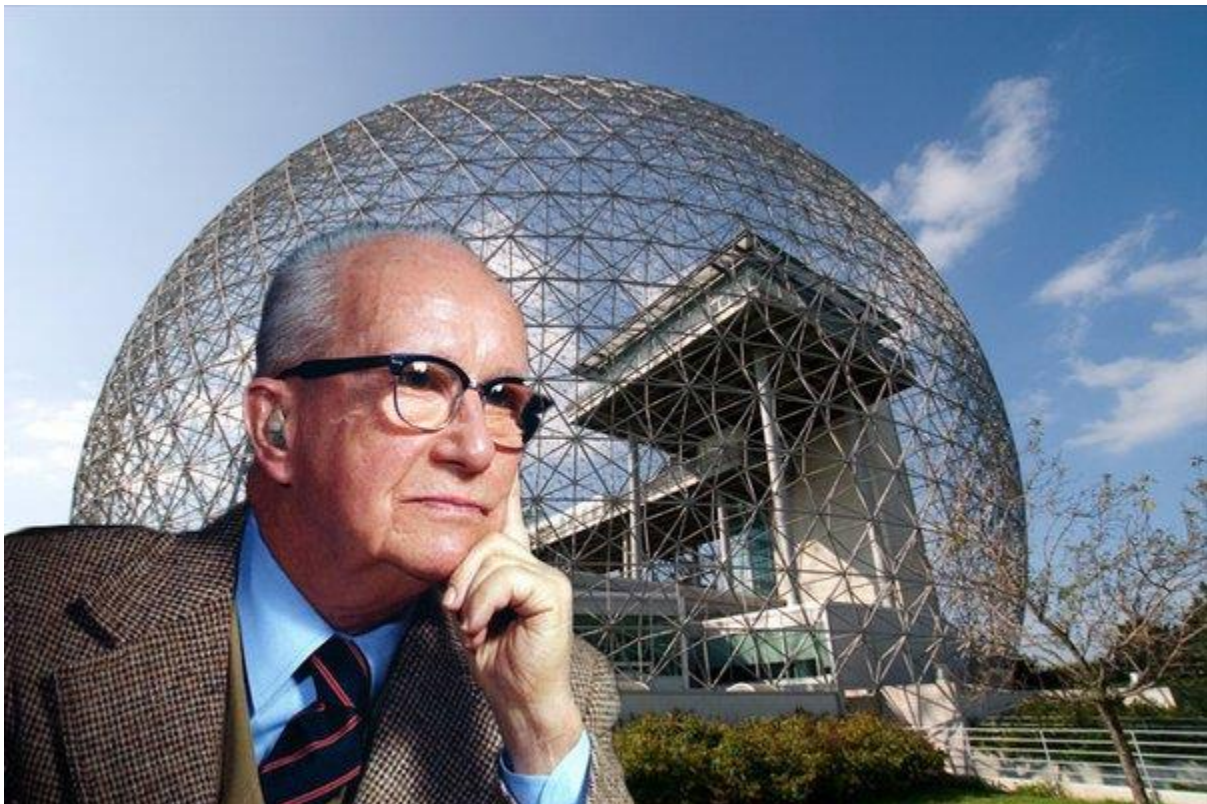
*Charlie Haden (right) is pictured above with Ornette Coleman. I heard him play the double bass and my life changed forever!... PHOTO COURTESY JAZZIZ MAGAZINE*



My dad once quoted his Field Marshall to me, “It doesn’t matter what you learn as long as it is hard.” He took an Einsteinian approach to all things, that from the generalised principles of the universe comes knowledge and then wisdom. I found later that from generalised principles also came creativity/epiphany and a philosophical approach to... well, everything. I became deeply intrigued by the concepts of artificial intelligence researcher/author, Douglas Hofstadter and design scientist, R Buckminster Fuller. Their ideas were hard (at first) but inspiring as hell to me.



*I became deeply intrigued by the concepts of artificial intelligence researcher/ author, Douglas Hofstadter (left) and design scientist, R Buckminster Fuller (below)....*



The numerically expressed patterns of the universe became music making tools for me. Pitch, rhythm and form were subjects for experimentation, utilising the generalised principles that governed my human experience of the chaotic equilibrium on Earth. I discovered that my favourite composers, Gyorgy Ligeti and Olivier Messiaen were influenced by ancient polyrhythmic structures from Africa

and India (respectively) and that they too appeared to be driven greatly by a desire to wield the structural might of universal architecture. Turned out that the most wild, rootsy, folk-like, avant-garde of my mentors, Ornette Coleman was a huge fan of the synergetic geometry of Buckminster Fuller. A grand, yin-yang paradox was emerging for me. The Western world composer's fascination with emergent evolutive musical forces and the (seemingly) chaotic African-American improvisors' fascination with design science.



*Turned out that the most wild, rootsy, folk-like, avant-garde of my mentors, Ornette Coleman (above) was a huge fan of the synergetic geometry of Buckminster Fuller...PHOTOGRAPHER UNKNOWN*

I wrote music for a group that expressed this paradox, 20th Century Dog, named to incorporate the breakthrough concepts in science and music of the 20th century and the floppy, playful mind of a dog. Existing to nourish the paradox apparent this was a successful musical project that brought me closer to many wonderful performers and attracted a niche (small and appreciative) audience. The music involved a higher than usual degree of rhythmic complexity and layering through the manipulation of small number, co-prime ratios. Surprisingly under-utilised in realms of musical rhythm and almost completely omitted from popular Western dance cultures, these very same co-primes are evident in the realisations of Plato and Pythagoras whence they explored our harmonic universe. My fascination continues to the present day in my post-graduate research at the University of Sydney where I am mathematically and geometrically transforming ancient rhythmic forms into new timelines and new works. Disclaimer here, by new I mean at the very least, new to me! Bringing me to playing music in an entirely new and exciting way (for me).

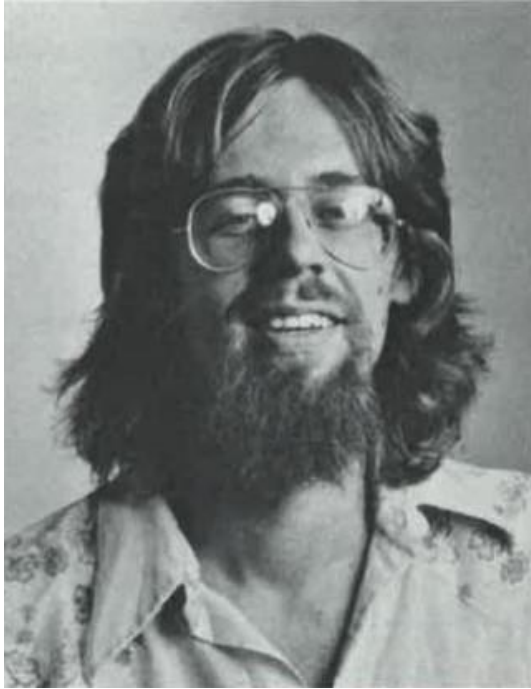


*Simon Barker (left) and Cameron Undy, performing in the group 20<sup>th</sup> Century Dog, in Venue 505 in 2015... PHOTO CREDIT AARON BLAKEY*

I've been studying scientific models of the evolutive rhythmic design from the African diaspora and allowing them to inform my own creativity in performance. Computer scientist, Godfried Toussaint has been most influential with his research papers 'The *Euclidean* Algorithm Generates Traditional Musical Rhythms' and 'The Rhythm that Conquered the World: What Makes a "Good" Rhythm Good?'. So too have the transformative elements outlined by Australian researcher, Jeff Pressing, most notably in his 2002 paper, 'Black Atlantic Rhythm – Its Computational and Transcultural Foundations'.



*Computer scientist  
Godfried Toussaint: his research  
papers have been influential ...*



*Australian researcher Jeff Pressing: also influential... PHOTO COURTESY JAZZ DOWN UNDER*

My own methodologies of additive, multiplicative and ratio driven rhythm mutation are now being applied to the guitar (I am a bassist by trade). Patiently processing the 'new' rhythm frameworks into my bodily movements, integrating them into the psychological and physiological constructs of my already ingrained jazz/blues/funk/rock languages.



*Undy: what, in heavens or on earth, is music?... PHOTO CREDIT LAKI SIDERIS*



Perhaps the most significant discovery for me at this time is that complex polyrhythmic interrelationships involving prime and or co-prime numbers, played by the hands on a guitar for instance, can be evenly metered intuitively in the feet. For example I can play a sequence with 13 divisions with my hands and tap an even pulse measures of 2 in my feet at a tempo where the cycle repeats within one second. The number 13 cannot be divided by 2, hence I must multiply 13 by 2 to create a 26 cycles per second subdivision in order to perform this combination. 26 cycles per second creates an audible pitch, just within the lowest audible range of human hearing, 1.5 cycles per second lower than the first key on a regular grand piano. Hence the ratio of 13:2 performed kinetically as rhythm within one second creates an 'unheard' frequency. I call this the '*ghost frequency*' and it happens whenever there is a co-prime ratio that underlies this sort of rhythmically generated experience. In a wonderful irony this *ghost frequency* lies outside of human rhythm perception as well as being unheard as literal pitch. So what?!?!

I hear you ask.

Well, let me say...

If the pulsation divisors required to perform a rhythm lie outside my rhythm perception as they are too fast and this 'too fast for rhythm' cycle generates what should be an audible frequency yet is unheard, how am I able to use it? What part of



*Undy on guitar: complex polyrhythmic interrelationships involving prime and or co-prime numbers, played by the hands on a guitar for instance, can be evenly metered intuitively in the feet... PHOTO COURTESY FACEBOOK*



my being is available to this phenomenon? Am I just fooling myself that I can even perform this type of correlating ratio and create such magical forces? Am I somehow mystically tapping into unheard notes and impossible to perceive rhythms, igniting the spirit, availing music that I am so deeply inspired by? Is it a *ghost frequency*? The biggest question being asked quietly in the back of my mind follows an intuition that this is what really drives humans to music in the first place. The mystique which we, for thousands of years have been trying to explain with maths, science, geometry, philosophy, poetry, language, even astronomy! What, in heavens or on earth, is music?



*Undy (left) pictured at Carriageworks in Sydney in 2015 with saxophonist Pharoah Sanders... PHOTO CREDIT TONY EGAN*

Music gets me up in the morning and keeps me up at night.

Society undervalues an existence that asks such questions daily and there is really no job application form that you can fill out where talking about this stuff is going to get you a six figure salary (or if there is please tell me). Yet, like I intimated to my mum as a teenager, I will die asking these questions. And like the Field Marshall's advice, I have chosen to learn something that is very hard which has and continues to be, a rewarding experience.

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***Other articles on this site which may be of interest:***

*John Clare, "Jazz in its Place: Venue 505", Loudmouth, December 6, 2017 at this link <https://ericmyersjazz.com/john-clare-20>*

*Eric Myers, review of Cameron Undy's solo guitar album "Ghost Frequency", The Australian, June 11, 2022, at this link <https://ericmyersjazz.com/cd-reviews-page-56>*