Unruly Orchestrations

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unruly (adj.) c.1400, from *un-* ('not') and *ruly* (obsolete) 'amenable to rule'

orchestration (n) 1855, from Fr. *orchestration*, 'to compose or arrange (music)'[1]

Creative practice is an often messy, noisy, unorchestrated activity, one that rejects norms and rules, but (ideally) ends up as a well composed, highly arranged final work. Staff of the Faculty of Arts and Design at the University of Canberra are experimenting with ways of thinking and making that allow them to build knowledge, while expanding the vigour and creativity of their art practice.

Unruly Orchestrations showcases collaboration and cross-disciplinarity as UC staff *orchestrate* the *unruly*. This exhibition brings together works from UC's creative writers, designers, architects and media artists, who are breaking out of the usual ways of working: who are exploring ideas in *unruly* ways.

1. D. Harper 2001 *Online Etymology Dictionary*, http://www.etymonline.com

The Twentieth Faculty of Arts & Design Staff Exhibition, University of Canberra.

Stephen Barrass

Scott Brook & Anya Jarosz

Owen Bullock

Sandra Burr

Ann Cleary

Adam Dickerson & Monica Carroll

Dianne Firth

Caren Florance

Ross Gibson & Kate Richards (with Aaron Seymour)

Katie Hayne

Katie Hayne & U.K. Frederick

Paul Hetherington & Jen Webb

Geoff Hinchcliffe

Geoff Hinchcliffe & Mitchell Whitelaw

Michael Jasper

Carlos Montana Hoyos

Lisa Scharoun & Justine Poplin

Shane Strange

Jordan Williams & Paul Hetherington

The CCCR workshop

Stephen Barrass

Tuning Fork and Variations

3D printed stainless steel, 2014 (9 forks, each 70 x 40 x 20 mm)

The tuning fork rules the orchestra through its precisely repeatable production of a tone at a specific frequency. The shape is designed to produce a simple tone, and slow-motion video shows how the two-pronged arrangement amplifies the primary mode of vibration while damping other more complex twisting and flexing modes. The variations on the tuning fork in this exhibition reconfigure the arrangement of the prongs to allow unruly vibrations. Could an unruly tuning fork sound interesting enough to join the orchestra? The exploration of the space of variations is facilitated by Computer Aided Design and 3D printing.

Research statement

These tuning forks are initial stages in a project to develop a theory of acoustic sound synthesis built on simple acoustic shapes, analogous to additive synthesis in electronic synthesizers.

In the first stage, a 3D CAD model of a tuning fork with a specific frequency was computed from a mathematical simulation. The CAD file was then 3D printed in stainless steel, and the acoustic precision of the digital fabrication process was evaluated by comparing the frequency of the physical tuning fork with the mathematical prediction.

The second stage is an exploration of the acoustic effects of variations on the shape of the fork, through the addition of prongs in different configurations.

Further work will explore other sonic primitives, such as triangles, tubes, cymbals, bells, and bowls. These experiments will provide the building blocks for more complex acoustic synthesisers. The theory of Cymatic Synthesis developed through this project will enable the Computer Aided Design of complex sonic objects constructed from acoustic primitives that can be fabricated by 3D printing.

1. Barrass, S. 2012 Digital Fabrication of Acoustic Sonifications, Journal of the Audio Engineering Society, Volume 60, Number 9, pp 709-715, September 2012, AES, USA
2. Barrass, S. 2013 Cymatic Synthesis of a Series of Bells, in Proceedings of the International Conference on Computer Music (ICMC 2013), Perth, Australia, 11-17 August 2013.