

Methodology Issue

Arguments in Object Design

Glenn Maxwell

Abstract:

Luthiers are those who make stringed instruments such as violins and guitars. The guitar is a heavily iconised object of pop culture and industrial materiality. The iconic, conventional form of the guitar and the idea of a 'perfect' or fixed form is questioned in my research. During design and fabrication, tensions build between design (for the end user), sonic performance and manufacturing processes. The tensions created act to contest which elements will be privileged above the others, embodying the concept of an argument where concessions are made, and a final resolute design emerges as a result.

Research Questions

What is the guitar as a sonic artefact within the context of digital fabrication? How can digital fabrication technologies offer new ways to produce immersive, body-resonant, atmospheric environmental positioning for the player and the listener?

How might an 'argumentative' approach enable traditional artisanal techniques and new design workflows to come into dialogue in producing sonic artefacts?

How can the pursuit of an imagined 'ideal' sound and the notions of 'correctness' in Luthiery practice be understood in the context of an experimental or argumentative practice?

Research Objectives

This project contends with the assumptive position of the practitioner (that the guitar as an object must conform to a conditioned sense of guitar-ness), offering possibilities for aesthetic exploration in sound and object and new experiential outcomes for non-musicians, as well as explicating the creative processes which sit behind the artefacts themselves. This research project will add to the critical understanding and practice techniques associated with 'ideal' sound form in Luthiery while also being relevant to designers and other practitioners working with sound, atmosphere and the subjective experience of audiences.

The research outcomes will have significance in object design and digital fabrication, delineating new workflows for the reinterpretation of design drivers and confluence for iterative design discovery. It will be relevant to other practitioners working with digital fabrication as an

element of artisanal creative practice and demonstrate how Luthieri can adopt new techniques and workflows.

Research Design / Methodologies

Heuristic research relies on discovery, and the methods used in this project leverage the idea of increasing the chances of discovery through both methods and analysis (Kleining and Witt, 2001).

Argument is an emergent tool for this research practice and has connections with the Pacific tradition of Talanoa – an open dialogue that embraces differing viewpoints, without expectations for agreement (Robinson and Robinson, 2005). Conversational dialogue as exemplified in Talanoa serves as a counterpoint to the traditional internal mental contest of traditional Luthieri. The suspension of presupposed outcomes offer important positioning for argument to act as the internal ideation machinery of creative practise and as a research tool it can be seen to shake off its Socratic linear roots in favour of conversational and situational exegesis.

By engaging in reflexive praxis as argumentation, the research will catalogue and unpack my current practice methods through sketches, CAD drawings, and 3D printed and machined artefacts, then seek to release predetermined outcomes in favour of exploring design potential through surrender to digital design and fabrication outputs. I will collect a record of my practice through photos, sound recordings, and notes analysed through subjective practice-oriented synthesis to capture the dialogue of practice, not merely its endpoints. The research explores areas of emergent digital fabrication technologies, bringing lenses of emergent creativity and heuristic discovery together with object permanence as a foil to guitar design and the artisan Luthier.

Employing various computer aided design (CAD) tools to actively design based on sketches and prototypes, I use Fast Fourier Transform (FFT) analysis, a computing algorithm which translates time and frequency domain data into frequency response data. This analysis runs in Grasshopper, a Plug-in for Rhino3D (my main CAD platform) and is able to provide multiple variable-surface outputs as propositions for speaker surfaces – a conversion of sound to surface.

I fabricate these surfaces in timber using computer numeric controlled (CNC) machining to carve out an abstracted form of the guitar soundboard. An electro-acoustic exciter activates the sound surface, playing either live guitar signals or recorded sources and subsequent recordings are made of the surfaces.

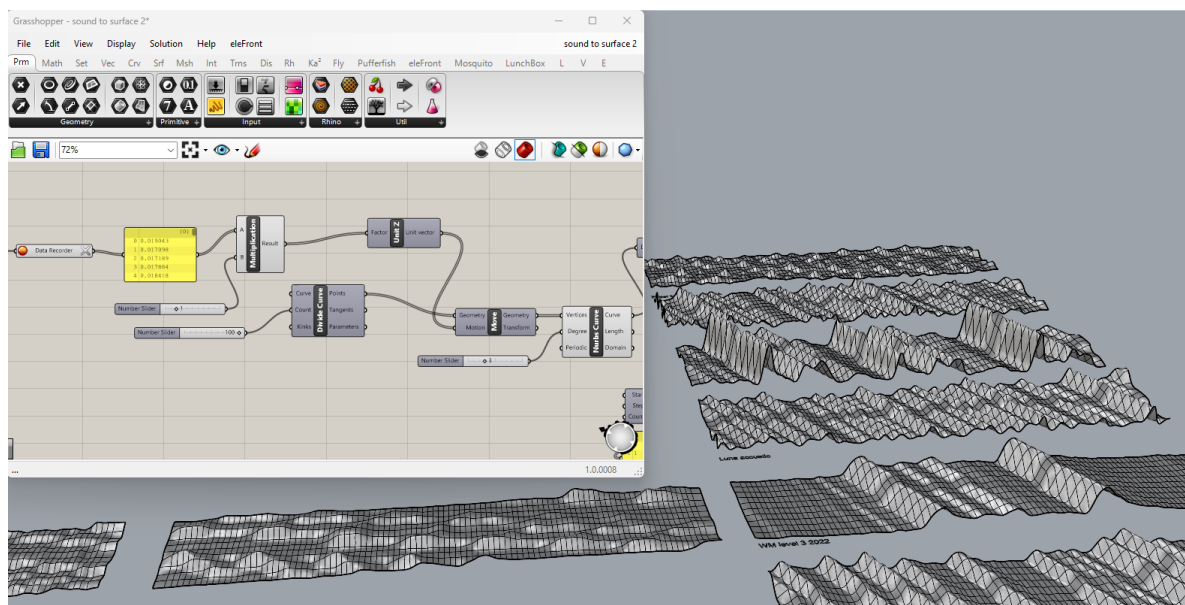


Figure 1. Screen capture from Rhino 3D and Grasshopper showing surface generation through algorithmic design. The Grasshopper plugin is seen in the window to the left, where the sound source is analysed and manipulated with different variables. The surfaces produced populate the grey background window and are then used as the basis for reductive machining, 2024, Authors image.

I catalogue and make notes and videos of the sound throughout the fabrication process, then record the sound of the guitars and sound surfaces with a high-fidelity microphone. This gives me a wide range of data to refer back to as the sound potential is explored in each object, challenging my understanding of how a guitar can sound, and interact with player and audience.

The data and the artefact act to form the propositions of an argument, but in a non-dialectic understanding, there isn't a for/against, pro/con contest of ideas but a range of interrelated and interdependent variables which lead the investigation. Multiple opportunities exist to refine specific elements and fold them back into a modern guitar design context, providing new instrument designs and further sound recordings. This cycle represents a traditional approach to Luthiery and reinforces the subjective impetus of the craft while also stimulating new areas for exploration.

Words of wisdom / hints

With the research still ongoing, it's been evident the I have found it overwhelming at times to explore the potential of a multi-variable system in a design context. I'm finding that keeping a few explorations going at once is necessary to keep the argument alive and the ideas flowing, but some ideas need to be shelved for later. I've set timelines for divergent exploration, knowing I want to bring this together and celebrate my findings in resolved prototypes. So,

while the method seems somewhat limitless, setting boundaries and being clear for myself has helped me keep on track.



Figure 2. Detail from sound surface, poplar and plywood 600mm x 500mm x 100mm, 2024, Authors image.

Conclusion

Surrendering design to algorithms and suspending my anticipation of favourable outcomes seems to be innate in the process of abstraction, and abstraction as a design method seems to yield further arguments in object design.

I would not have considered the designs I'm currently exploring, let alone let the sound artefact dictate the physical artefact without this methodology.

In Luthiery, we are driven toward design for a commercialised sound ideal, and for a long time, this has constrained my thinking and practice. I hope the process can continue stimulating my creativity and challenge my perception.

At this stage in the research I feel like Argument for Object Design has the ability to help me understand the areas I'm yet to know I don't know.

References

Kleining, G., & Witt, H. (2001). Discovery as Basic Methodology of Qualitative and Quantitative Research. *Forum Qualitative Sozialforschung Forum: Qualitative Social Research*, 2(1). <https://doi.org/10.17169/fqs-2.1.977>

Robinson, D., & Robinson, K. (2005). "Pacific ways" of talk: Hui and talanoa, NZ Trade Consortium Working Paper, No. 36, New Zealand Institute of Economic Research (NZIER), Wellington. <https://hdl.handle.net/10419/66100>