Riddare of The Round Table: Inclusive Haptic Performance Practices in The Wild

Lloyd May
CCRMA, Stanford University
660 Lomita Crt
Stanford, CA 94305
lloyd@ccrma.stanford.edu

Peter Larson
ShareMusic & Performing Arts
Brahegatan 35A
563 32 Gränna, Sweden

Joel Mansour
ShareMusic & Performing Arts
Brahegatan 35A
563 32 Gränna, Sweden

Tord Bremnes
ShareMusic & Performing Arts
Brahegatan 35A
563 32 Gränna, Sweden

Figure 1: *Parasonic* and Lloyd May performing the opening of *Ridare of the Round Table.*

ABSTRACT

This demo paper presents the development of "Riddare of The Round Table", a structured improvisational piece lasting approximately 20 minutes. Written in close collaboration with the mixed-ability inclusive ensemble *Parasonic*, the piece features cello, daxophone, found objects, a wooden table with vibrotactile transducers and contact microphones, tablet synthesizers and samplers, and electronics. At the beginning of the piece, audience members were invited to feel the vibrations being transduced into the wooden table before taking their seats. The vibrations served as feedback for the ensemble members, who were largely using tablets, as well as a source of feedback generation as the output of the contact microphone was fed into the transducers.

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Author Keywords

Inclusive performance, haptic art, vibrotactile

CCS Concepts

•**Applied computing** → **Sound and music computing;** Performing arts; •**Human-centered computing** → *Accessibility systems and tools;*

1. INTRODUCTION

This demo paper details the technical and compositional processes involved in the development and performance of *Riddare of The Round Table* (RoRT), an approximately 20-minute structured improvisation for an inclusive ensemble for cello, daxophone, found objects, haptic feedback table, tablets, and electronics. A recording of a public performance is available here: https://vimeo.com/942718914.

The piece was developed through a collaboration between Lloyd May, a music technology and applied Disability studies researcher from Stanford University who identifies as Disabled with a chronic pain condition, and *Parasonic*, an inclusive, mixed-ability ensemble coordinated by *ShareMusic & Performing Arts*, a non-profit inclusive arts organization from Sweden. The collaboration and workshops were facilitated and supported by ShareMusic.

2. COMPOSITIONAL PROCESS

2.1 Background and Influences

We drew methodological inspiration from large-scale inclusive ensemble work, such as Alessandrini's Mondgewächse [1], which saw various inclusive instruments developed in close collaboration with members of the ensemble, balancing flexibility with appropriate structure and scaffolding, as well as May's previous co-design work with Peter Larson of *Parasonic* [5]. Works that centered haptic and vibrotactile feedback in addition to audio were touchpoints for this project, such as Hayes' *Skin Music*, which used multiple haptic transducers attached to a chair to create an intimate installation, and May et. al.'s haptic interpretations of various sound art pieces as part of the Smithsonian American Art Museum's *Musical Thinking* exhibition [4, 6]. Additionally, feedback instruments, such as Nicolas Collins' many systems such as *Pea Soup* [2] and Eldrige's self-feedback cello [3], inspired

the choice to actively control feedback between the transducers and piezo contact microphones.

2.2 Development of RoRT

The collaboration began with two online video meetings to discuss previous experiences, and avenues of possible exploration, as well as an explanation of any technologies or concepts that might be used in the piece. Haptic transducers and vibrotactile feedback (VTF) were offered by May as a point of primary interest, and members of Parasonic brainstormed ways to explore VTF in their process. Initial brainstorming ideas include intra-performer communication through VTF (possible during a telematic performance), a sound and VTF installation that is fixed in space and runs continually and a shared group instrument that the ensemble and audience members could play and experience together. After discussing the various ideas via email and video meetings, we decided to pursue the shared instrument concept. May presented various possibilities for this ranging from hanging sheets of metal to children's toys with transducers, but ultimately decided on preparing a table to be the focus of the instrument and the piece itself. This choice was made to evoke imagery of camaraderie and community, of being gathered around a kitchen or bar table. The choice of a table had additional practical benefits such as ease of sourcing and set-up.

The details of the instrument and the piece itself were developed over a 3-day in-person workshop in Town A, Country A, at the Town A Community Black Box Theatre, from 20-22 November 2023. We structured the workshop utilizing an assets-based workflow, where individual members of the team were encouraged to work on the pieces of the project they felt most interested in. This led to the first day being dedicated to technical development and set-up, where May attached one Dayton Audio BST1, three Dayton Audio DAEX25 transducers, and two piezo contact microphones to the table, and created a Max MSP patch to control the routing, levels, and spatialization of the signals being sent to the transducers. Mansour and Bremnes focused on sound design, exploring relevant tablet apps for sounds of interest, and attaching a piezo contact microphone to Larson's power wheelchair to record the vibrations transmitted by their chair while navigating the world. These recordings were then edited and clipped into one-shot samples that were used as part of the piece. Bremnes focused on collecting found objects and shaping various wooden planks into daxophones that would be affixed to the table. The workshop was structured to honor all member's access needs, such as taking group breaks every two hours, a full-hour break for lunch, and ensuring all paths were wheelchair accessible.

The second day began with a technical run-through, ensuring that the Max MSP patch was accessible via *Mira* on ensemble members' tablets to facilitate real-time manipulation and spatialization of VTF signals to the table. Once all the technical issues were ironed out, we discussed the composition of the piece and decided to have four discrete sound and vibration 'worlds' that we would move between throughout the piece. These were structured to provide various aesthetic touchpoints that might be more familiar to an audience member, such as the largely diatonic textures and melodies used in the cinematic first two sound worlds:*Sampled Trombone and Cello* and *Grand Synth and Cello*. This was accompanied by fairly constant VTF on the table gradually moving from transducer to transducer in a swirling motion, and ensemble members used tablets to play sounds from digital synthesizer and sampler apps including

Figure 2: The table turned upside down, revealing the transducers and contact mics attached. All components attached to the table were routed to a *Scarlett 18i20* interface and *Lepy 50 Watt* audio amplifiers.

Gestrument and *Koala Sampler*. The contact microphones attached to the table were used to amplify sounds made on the table during these sections, with little self-resonating feedback being used. This was followed by the *Scratchy* sound world, which included more broad-band sounds such as bow scratches on the cello strings and open palm rubbing on the table. The transducers and contact microphones were used to create self-resonating feedback by feeding the output of the contact microphones into the transducers and shaping the resultant signal through pitch shifting, amplitude modulation, and panning. Found objects were used during this section to excite the table as well as for comedic and textural variation. The final sound world, *Daxophone and Sampled Cello*, utilized the daxophones and sampled cello on *Koala Sampler* to create melodic textures that were supported by table scratches and feedback textures.

The piece was shared on 22 November 2023 in the black box theater in Town A. Initially planning on allowing audience members full access to the table at any point in the performance, we revised this so that audience members were invited to feel the table as they were entering, as the anticipated size of the audience had grown beyond a point were full access would be feasible and equitable. To accommodate this, we elected to perform the piece twice, with a discussion with the audience providing a break between the two performances. Additionally, the second performance would be a *relaxed* performance, where audience members were invited to roam around the stage with the house lights on and look over the performer's shoulders to see what they are doing, interact with the table, and leave at any time.

3. REFLECTIONS

After the public sharing, we had a debriefing and reflection session with Parasonic, May, and members of ShareMusic. Overall, we were very pleased with the piece and enjoyed the performance and development experience. There was an appetite to develop the piece further as well as a sadness when the prepared table was taken apart. Pain points were however identified, notably a feeling of tight time con-

straints and the frustration caused by debugging a complicated VTF set-up.

The assets-based workflow afforded a greater efficiency in task completion with no one member ever feeling like they are waiting on someone else or that they are holding the process up. However, this did lead to some members feeling uncertain of the final form of the piece throughout the process, as the process could have benefitted from additional short check-ins to ensure everyone was aligned on the direction of the piece.

The haptic transducers posed a complication as ensemble members did not have extensive prior experience with VTF and required time to familiarize themselves with the technology and the sensation of musicking with this added layer present. While the pre-workshop online were helpful for conceptual alignment, they did not afford the ensemble members an opportunity to experiment with VTF in an embodied manner. Having access to modular set-ups that do not require large interfaces for multi-channel VTF would be greatly beneficial.

The use of inclusive *relaxed* concert practices, such as inviting audience members to explore the stage and interact with the table, not only provided audience members with an opportunity to gain additional perspectives on the performance practices being utilized, but potentially offered a more inclusive environment for audience members who find standard concert practices and expectations inaccessible or unwelcoming. Additionally, inviting the audience to touch the table at the beginning afforded some access to the VTF, however further audience interaction and VTF could have been implemented through several smaller performances.

3.1 Future Work

Future work exploring the concepts initiated in this piece could include a more modular approach to VTF that would allow ensemble members to experiment with VTF devices more easily at as well as the development of a streamlined way to share VTF files. Currently, the bespoke nature of most VTF devices and setups makes creating and sharing VTF works challenging for non-technologists.

4. ACKNOWLEDGMENTS

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5. ETHICAL STANDARDS

This project followed the best practices defined by ShareMusic. All participation was voluntary, and ShareMusic ensured accessible and safe working conditions, as well as ensuring that all parties involved were not economically burdened by any part of the process.

6. REFERENCES

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