

Housework Commons: Textile Rhetorics II

JOCELYN HO, The University of Sydney

1 Program Notes

Housework Commons, a feminist activist project under the Women's Labor initiative, transforms domestic tools into Embedded Acoustic Instruments (EAI) using sensor technologies. It reimagines unpaid, undervalued domestic labor—traditionally private—as a shared act of activism, addressing global gender inequality in domestic work through public engagement with gendered objects.

Housework Commons includes three custom instruments:

1. **Embedded Iron v.3** by Ho, J., Schedel, M., Cosgrove, R., Bhatt, O., and Blessing, M., based on an early-20th-century ironing board and iron, uses machine learning and sensors to alter pitch based on the iron's position and sound quality (timbre) depending on fabric color and texture. The board acts as a resonator with a transducer and speaker.
2. **Rheostat Rotary Rack** by Ho, J., Schedel, M., Jacobs, B., Loveless, M., inspired by a rotary dryer, features rheostats, a rotary encoder, and an 8-speaker base. Hanging clothing triggers pitches based on weight, while rotating the rack by hand or wind adds select frequencies.
3. **Embroidery Hoop**, by Yuditskaya, S., Ho, J., and Schedel, M., with an embroidered textile speaker that acts as an electromagnetic scanner.

The performance of new composition, Textile Rhetorics II for three performers by Jocelyn Ho, Margaret Schedel, and Sofy Yuditskaya will feature the three instruments with the bowed psaltery and other found objects from the domestic sphere. Central to Textile Rhetorics II are woven textile scores and fabric banners.

2 Project Description

2.1 Background

Housework Commons aims to revalue reproductive labour and amplify the voices of women. It is inspired by feminist Marxist scholar Silvia Federici's concept of "reproductive commons" that describes grassroots activist activities in Latin America, where women communally perform domestic work, such as cooking and caregiving, in public spaces as acts of resistance [1]. These reproductive commons reorganize and socialize domestic work and challenge the invisibility and isolation of unpaid labour. The project uses the idea of "reproductive commons" to inform its public installations and performances, turning private labour into a communal and public experience, in which participants become creative agents of political change to make a communal social statement [6]. The participation in "Housework Commons" by the public also de-genders housework, such that housework is now visibly done by not just women, but people of all genders.

2.2 Instrument Design

The installation will consist of three Embedded Acoustic Instruments (EAI), designed to be self-contained units that house all the components necessary for performer interaction, data mapping, synthesis, and sound generation, such that their identities as domestic objects become foregrounded and can elicit natural, housework gestures when participants come into contact with them [7].

2.2.1 *Embedded Iron v.3*

The *Embedded Iron v.3*'s design is inspired by a cross between an antique coal iron and a 1960s steam iron, equipped with sensors. The iron's movements across the board are captured by a Light Detection and Ranging (LiDAR) sensor and an ultrasonic sensor which determines the ironing board's x-y position on the board; a spectroscopy that detects the spectroscopy profile of clothing being ironed via eighteen bands of reflected light. Machine learning software Wekinator is used to train the data to map to various sonic parameters, and sound generation is based on the physical modelling of a violin. Sound design inverts gender norms and pertains to an inter-sensory experience of the iron as hot and searing; sound generation is based on the physical modelling of a violin—an instrument traditionally frowned upon when played by women in the 19th century [5]—with distortion and FX. This setup allows for a dynamic and responsive interaction, where subtle variations in color or texture produce distinctive changes in timbre [5].

The *Embedded Iron* has undergone iterative development; previous versions have used pressure and optical sensors for a different gestural-sound experience. Through the iterative development, *Embedded Iron v.3* incorporates user feedback and research on biomechanics, including material to optimize the weight of the iron, shape and material for a comfortable hand grip, and the body design of the iron so that the grip is close to the iron's center of weight.

2.2.2 *Rheostat Rotary Rack (RRR)*

The *RRR* [6] draws inspiration from the Australian Hills Hoist Dryer, a rotating clothes drying rack. Like the *Embedded Iron*, the *RRR*'s design parallels the actions of the domestic tool it references, where hanging clothes triggers specific sounds, and rotating the rack introduces further pitches based on the string's original pitch to manipulate timbre. Structurally the *RRR* consists of four branches, each holding two strings where fabric can be hung; a central trunk supporting the branches and rotating through a base; a custom-made wooden box serving as the base and housing eight speakers for 360-degree spatialization.

The *RRR* uses potentiometers and a rotary encoder to capture user interaction: eight potentiometers, one for each string, measure the weight of the hanging fabric. These signals are sent to a Teensy 3.2 microcontroller and then wirelessly transmitted via an ESP8266 microcontroller to a Raspberry Pi. The weight data is then used to trigger different pitches and timbres in the audio synthesis engine, realized in Pure Data running on the Raspberry Pi. A high-resolution rotary encoder attached to the base measures the rotational speed of the trunk. This data controls the introduction of additional frequencies and rhythmic patterns, creating a dynamic soundscape that responds to the velocity of the rotation.

The *RRR*'s sound design utilizes samples of aerophones, including wine glasses and whirly tubes, to create a sonic palette reminiscent of wind drying. The wooden base of the *RRR* not only houses the electronics but also acts as a resonator, amplifying and colouring the sound produced by the eight speakers. Two low-frequency transducers, four mid-range speakers, and two high-frequency tweeters are strategically positioned within the base to create a rich and immersive sonic experience.

Both the *Embedded Iron* and the *RRR* exemplify the project's focus on material engagement, in which the repurposing of familiar domestic objects aims to shift practices and attitudes about gendered domestic labor.

2.2.3 New Composition: *Textile Rhetorics II*

Six compositions have been commissioned under the *Women's Labor Project* for various iterations of the instruments. These include:

- Ho, Jocelyn and Schedel, Margaret. *Textile Rhetorics* (2025). For 2 Embedded Irons, 2 bowed psalteries and found objects with woven scores. Premiered at CUNY by Ho and Schedel.
- Schedel, Margaret. *Body of Resistance* (2023). For *Rheostat Rotary Rack Prototype*. Premiered at NYC Governor's Island by Schedel.
- Ho, Jocelyn. *Marzelline's Confessions* (2022). For *Embedded Iron*. Premiered at MACBA Convent dels Àngels, Barcelona, International Symposium for Electronic Arts by Schedel.
- Ho, Jocelyn and Margaret Schedel. *Housework Lock (Her) Down* (2020). For Multiple *Embedded Irons*. Published in *Women & Music Journal* (December 2021). Premiered at Nownet Arts Conference.
- Schedel, Margaret. *Ring Down* (2019). For solo *Embedded Iron*. Premiered by Ho at UCLA Art-Sci Gallery.
- Nourbakhsh, Nilourfar and Chelsea Lowe. (2021). *Greyscale*. For two *Embedded Irons* and percussion. Premiered at NYC Governor's Island.

This will be the first composition featuring both *Rheostat Rotary Rack* and *Embedded Iron*, and incorporating the “living archive” concept with workshop engagement. The concept of the textile scores and workshop fabric banners for *Textile Rhetorics II* expand on the special fabrics used in *Housework Lock (Her) Down* and *Body of Resistance*.

In *Housework Lock (Her) Down*, a special white apron that trigger sounds when ironed by the *Embedded Iron* (Fig. 1), mapped to misogynistic texts from a 19th-century marriage manual [4]. The apron acts as a physical object that encapsulates the historical baggage and societal expectations associated with women and domestic labour. When the apron is ironed during the installation and performance, the spectroscopy sensor in the *Embedded Iron* detects its colour and triggers the playback of the pre-recorded misogynistic quotes. This interaction aims to provoke a critical reflection on the persistence of gender inequality and the ways in which societal expectations are imprinted on women's bodies.

In contrast, in *Body of Resistance*, seventeen banners are embroidered with quotes from the diaries and patents of Mary Hallock-Greenewalt, a pioneering musician and inventor of the non-linear rheostat who famously defended her patents against General Motors. The banners, each made from a different fabric with distinct lengths, widths, and weights are hung on the rack, triggering sounds (See Fig. 2). In performance, the quotes on the banners are read aloud by the performer, before the banner is hung and spun according to the embroidered coded instructions.

Textile Rhetorics II takes a new direction with woven scores, designed for both instruments, to further exemplify the intertwining of fabric and performance. Each score is associated with certain “attitudes” or affects, denoted by associations between body movement and expression in Eleanor Georgen's 1893 manual *The Delsarte System of Physical Culture* that teaches rhetoric through body language [2]. At a time when public rhetoric was male-dominated, physical culture became an empowering tool for women to express themselves in public. These textile scores, inspired by rhetorical principles, celebrate female empowerment, contrasting with misogynistic quotes from a 19th-century marriage manual that are mapped onto a special white apron.

In *Textile Rhetorics II*, each score is associated with an “attitude” of the eyeball, with four scores woven in total (Fig. 3). The colors, textures, and weights of fabrics are chosen to map to different timbral qualities of the *Embedded Iron* and pitches of the *RRR* inspired by each attitude. *Textile Rhetorics II* features nine woven scores each capturing an “attitude,” where the two performers take turn choosing one of the nine scores to play the instruments (iron, hang, spin), with the “attitude” denoted by the score’s eyeball. At particular moments, the performers choose a workshop banner to read out and play, modulate their reading performance to the score’s attitude.



Fig. 1 and 2: Rheostat Rotary Rack with embroidered banners; Embedded Iron with special white apron.



Fig. 3: Two of the nine woven textile scores, each with associated “attitudes” of the eyeball, hanging on an outdoor drying rack.

3 Performance Notes

The three instruments will be placed side by side so the public can easily move between them. To ensure accessibility, they are best presented on level ground with no steps to ensure ease of movement

for all participants. Other objects include: two laundry baskets (which we will supply) will be placed on the ground to hold fabrics and clothes, a music stand to hold the banners with texts, and a small table for folded clothes.

The Embedded Iron's dimensions are based on the wooden ironing board: 16" (w) x 43" (l) x 31" (h).

The Rotary Rack's dimensions are measured by the end-to-end width of the arms: 67" (w) x 67" (l) x 75" (h).

Laundry basket: 12.5" (w) x 20.5" (l) x 11" (h).

Total ground footprint: approximately 118" x 79".

Other Requirements: Access to a power socket.

4 Media Link(s)

<https://vimeo.com/1051389504?share=copy>

Improvisation performance of “She is what and what and what” and “Noise Edge”—explores the interactivity between the two instruments and a wide range of affective qualities and gestures—from meditative to frantic. The sounds of these domestic tools are inter-sensory according to its everyday usage: while the Iron's sound design is searing hot, with different layers of noise (through sound synthesis and FX), the Rack's sound design is cool and wind-powered- using aerophone sounds that implements Jean-Claude Risset's Harmonic Arpeggio. While “She is what and what and what?” The performance begins with the Iron's hesitant blips and blops coupled with note-to-note peg playing on the Rack, crescendoing to a full gamut of noise from the Iron and polyrhythmic beats from the Rack. The Rack is tuned to 2 sets of harmonic series: heavy weights are mapped to low to mid-range tones, and lighter weights are mapped to high-pitched range at the edge of human hearing. *Textile Rhetorics II* will play with the affective contrasts of the instruments as denoted by the scores.

“Body of Resistance”— A contrasting, meditative performance that brings feminist history and innovation to life. Inspired by Mary Hallock-Greenewalt, a pioneering inventor and musician who revolutionized light rheostats for audiovisual performances, the piece celebrates acts of resilience and creativity, particularly by women. The performer manipulates embroidered banners—crafted with quotes from Hallock-Greenewalt's patents—on the Rack. As banners are hung and spun, the piece unfolds at a contemplative pace, creating an evolving interplay of movement, sound, and texture. Premiered outdoors on Governors Island, the performance embraced the natural unpredictability of the wind, which became an unexpected collaborator in this dynamic artwork. *Textile Rhetorics II* will similarly involve fabric banners, but from workshops, to be played not only with the *RRR* but also with the Iron.

5 Ethical Standards

No conflicts of interest were identified. All researchers and audience participants took part consensually in the activities outlined in this paper. Audience participants were free to participate or not participate in the installation.

6 Acknowledgements

This performance involved additional performers and co-composers Margaret Schedel (Stony Brook University) and Sofy Yuditskaya (Pôle Universitaire Léonard de Vinci).

References

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