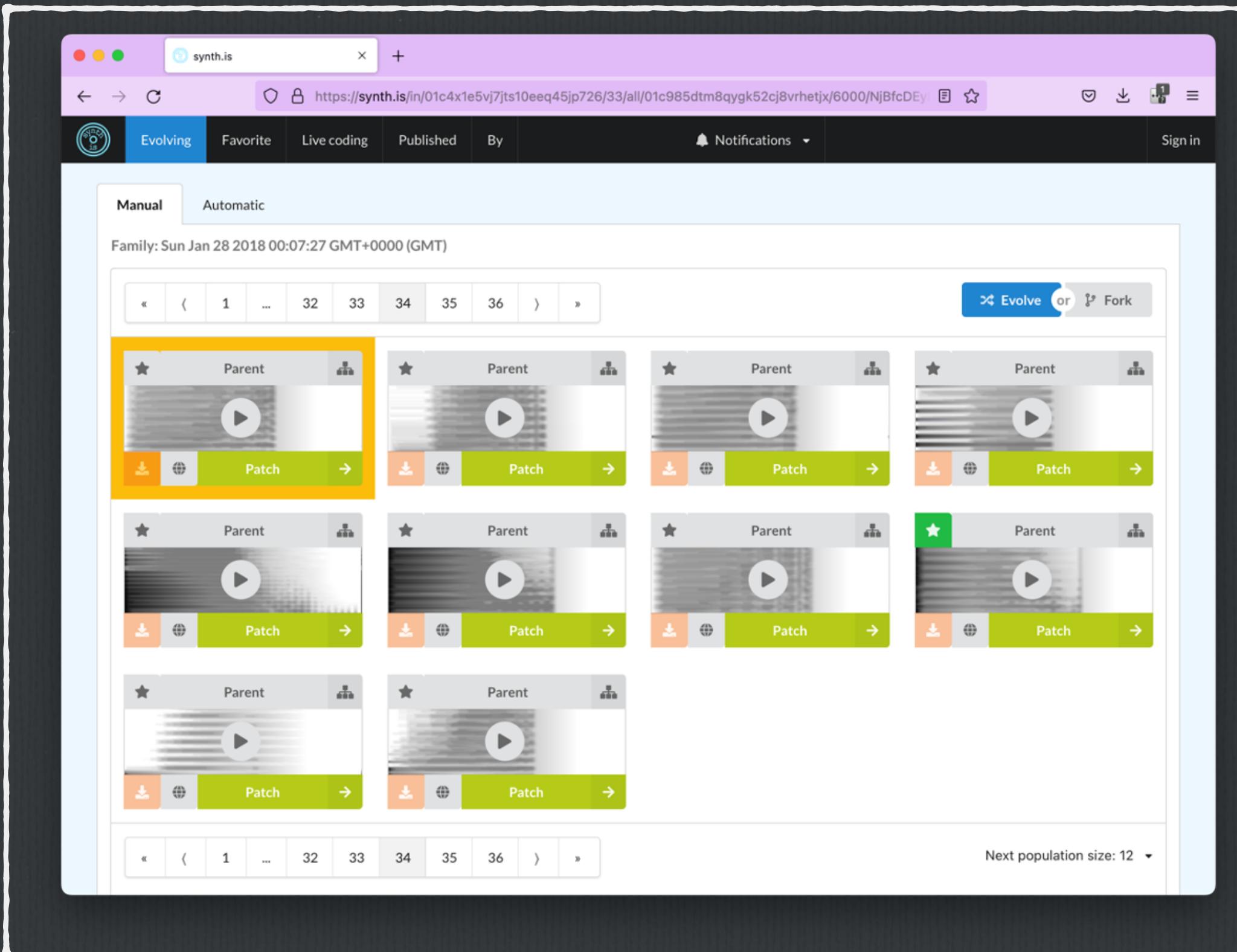


# Robiohead

New Interface for Sound Evolution (NISE)

# Motivation and key features



- Tangible interaction with sample based virtual music instruments
- Explore evolutionary interaction

# Instrument for playing



- Toys are:
  - The purest thing for play
  - Excuses for playing
  - Embodiments of play
  - Instruments for playing

# Instant music, subtlety later

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"music like instant coffee" @ DALL-E

- Transient and frivolous musical activities
- Expressivity without difficulty

McDermott, James, Toby Gifford, Anders Bouwer, and Mark Wagy. 2013.

"Should Music Interaction Be Easy?"

Pp. 29–47 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing, edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.

Cook, Perry R. 2009.

"Re-Designing Principles for Computer Music Controllers: A Case Study of SqueezeVox Maggie." in NIME.

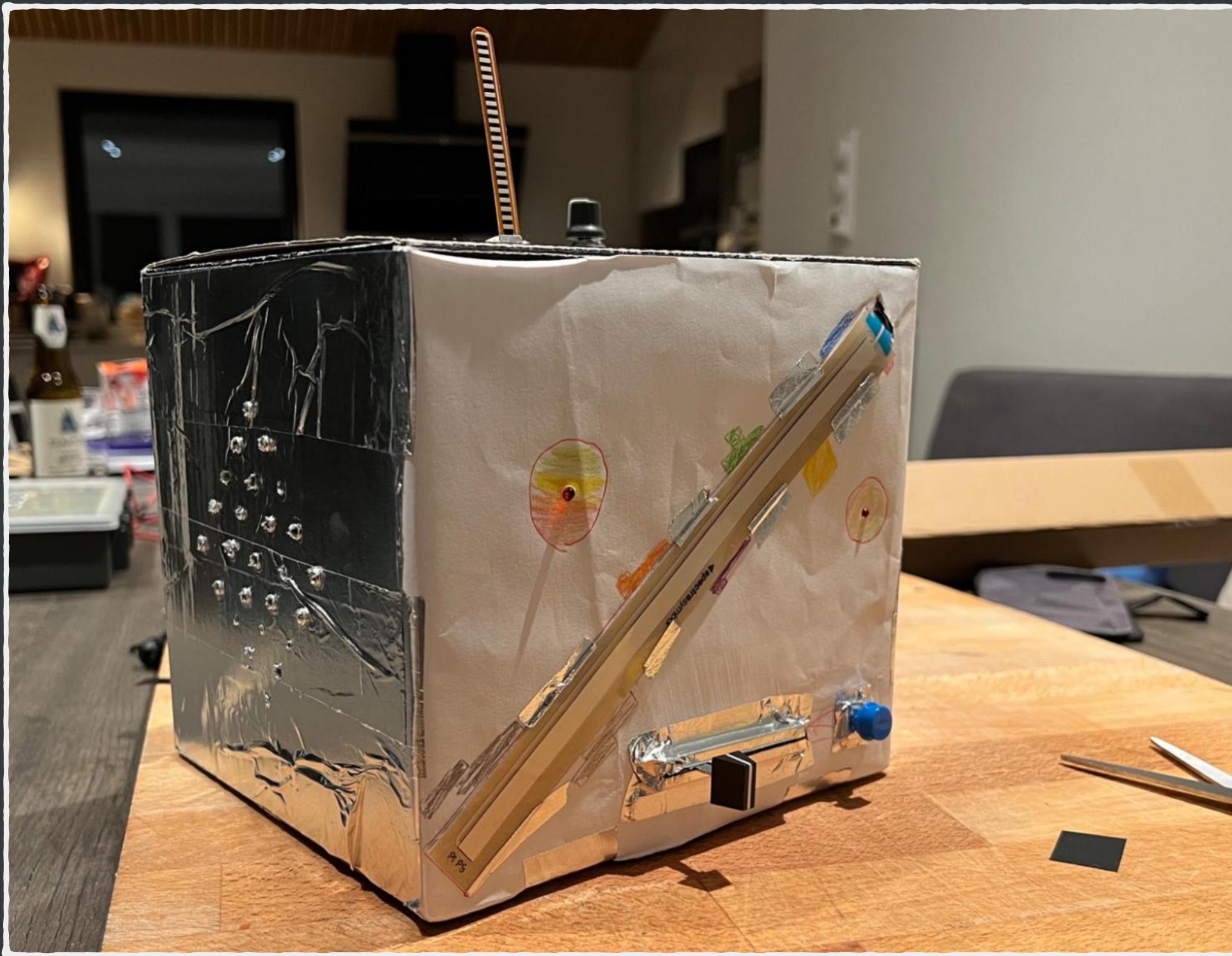
Holland, Simon, Katie Wilkie, Paul Mulholland, and Allan Seago. 2013.

"Music Interaction: Understanding Music and Human-Computer Interaction."

Pp. 1–28 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing, edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.

# Mapping and expressivity

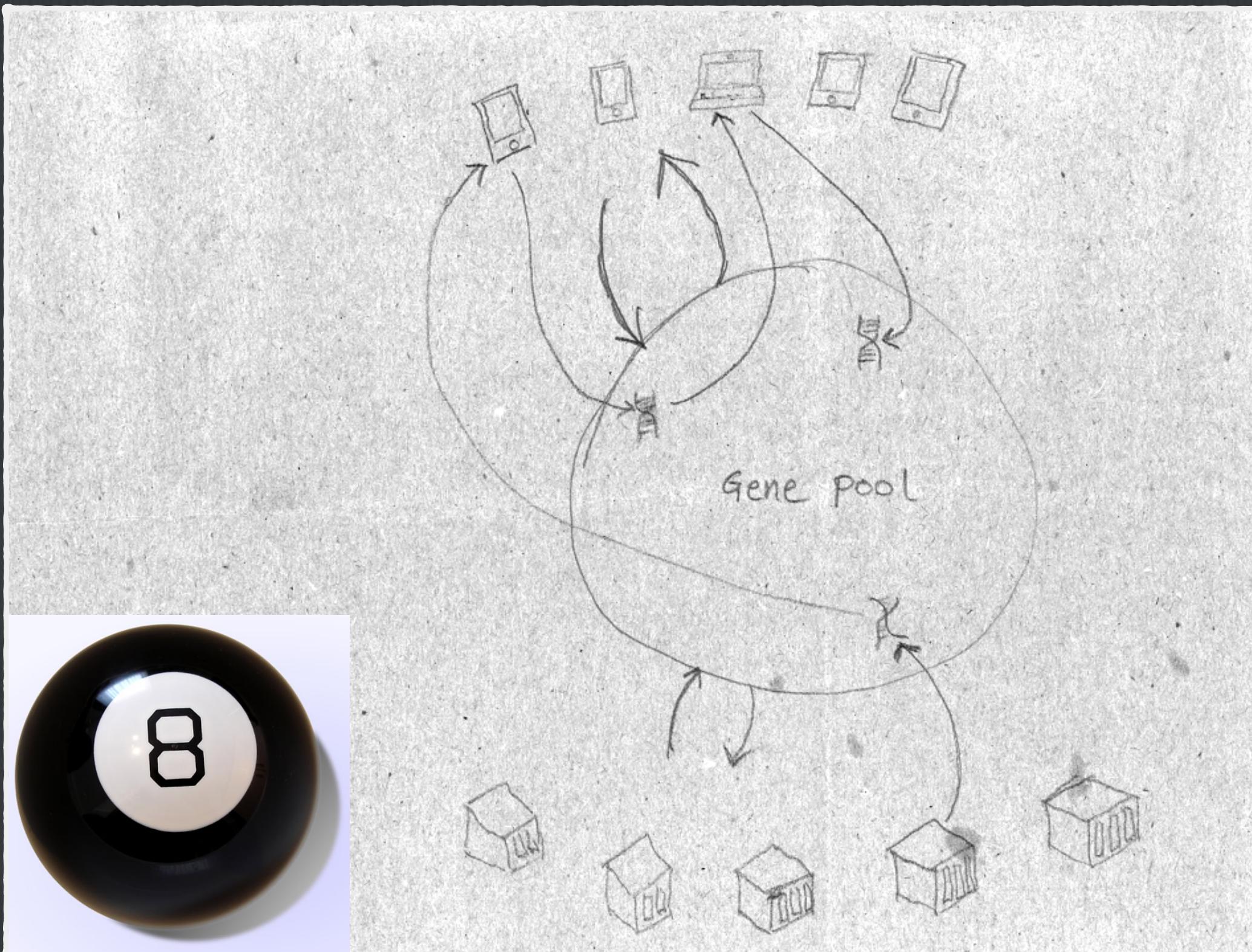
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- Three-to-one mapping for tuning lattice navigation**
- Additional one-to-one mapped sensors for auxiliary expression**
- Skill in Interactive Digital Music Systems**
- Balancing instrument expressivity versus difficulty**

Gurevich, Michael. 2014. "Skill in Interactive Digital Music Systems." P. 0 in *The Oxford Handbook of Interactive Audio*, edited by K. Collins, B. Kapralos, and H. Tessler. Oxford University Press.  
Pardue, Laurel S., Andrew McPherson, and Dan Overholt. 2018. "Improving the Instrumental Learning Experience through Complexity Management." 8.

# Evolutionary interfaces



<https://commons.wikimedia.org/wiki/File:Magic8ball.jpg>

- Shake up that gene pool
- Clear conceptual model?

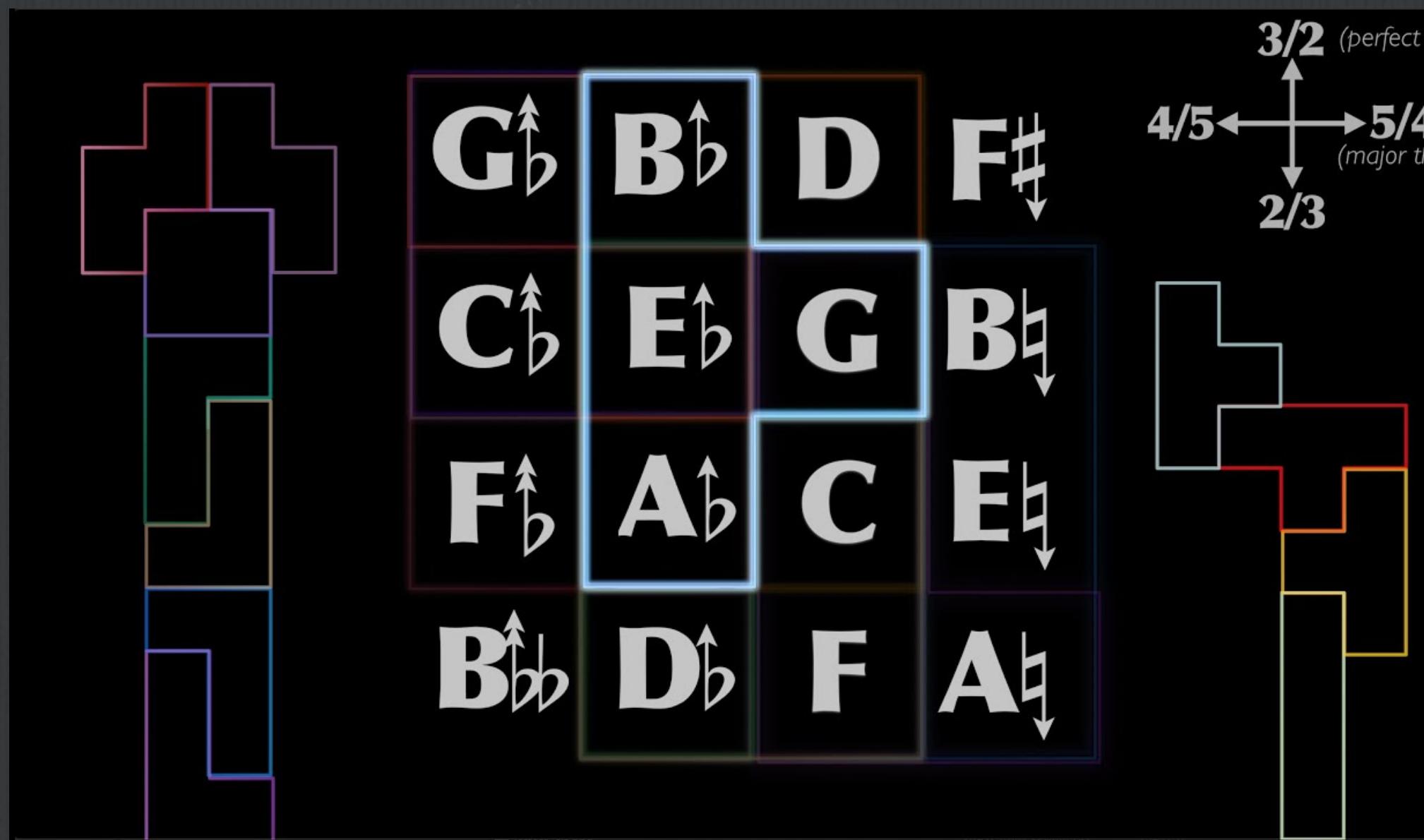
McDermott, James, Dylan Sherry, and Una-May O'Reilly. 2013.  
“Evolutionary and Generative Music Informs Music HCI—And Vice Versa.”  
Pp. 223–40 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing,  
edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.

Norman, Donald A. 2002. *The Design of Everyday Things*. 1st Basic paperback. New York: Basic Books.

Gaver, William W., Jacob Beaver, and Steve Benford. 2003. “Ambiguity as a Resource for Design.”  
Pp. 233–40 in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '03*. New York, NY, USA: Association for Computing Machinery.

Zappi, Victor, and Andrew P. McPherson. 2014.  
“Dimensionality and Appropriation in Digital Musical Instrument Design.” 6.

# Microtonal tetris



[https://youtu.be/CSL\\_Axohw94](https://youtu.be/CSL_Axohw94)

- Interfaces in general to simplify and enable complex tasks
- IMS to simplify and enable music generation
- Tuning system embedded in the instrument's design
- Defining a space for potential expression
- A piece in itself?

Wallis, Isaac, Todd Ingalls, Ellen Campana, and Catherine Vuong. 2013.  
“Amateur Musicians, Long-Term Engagement, and HCI.”  
Pp. 49–66 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing,  
edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.

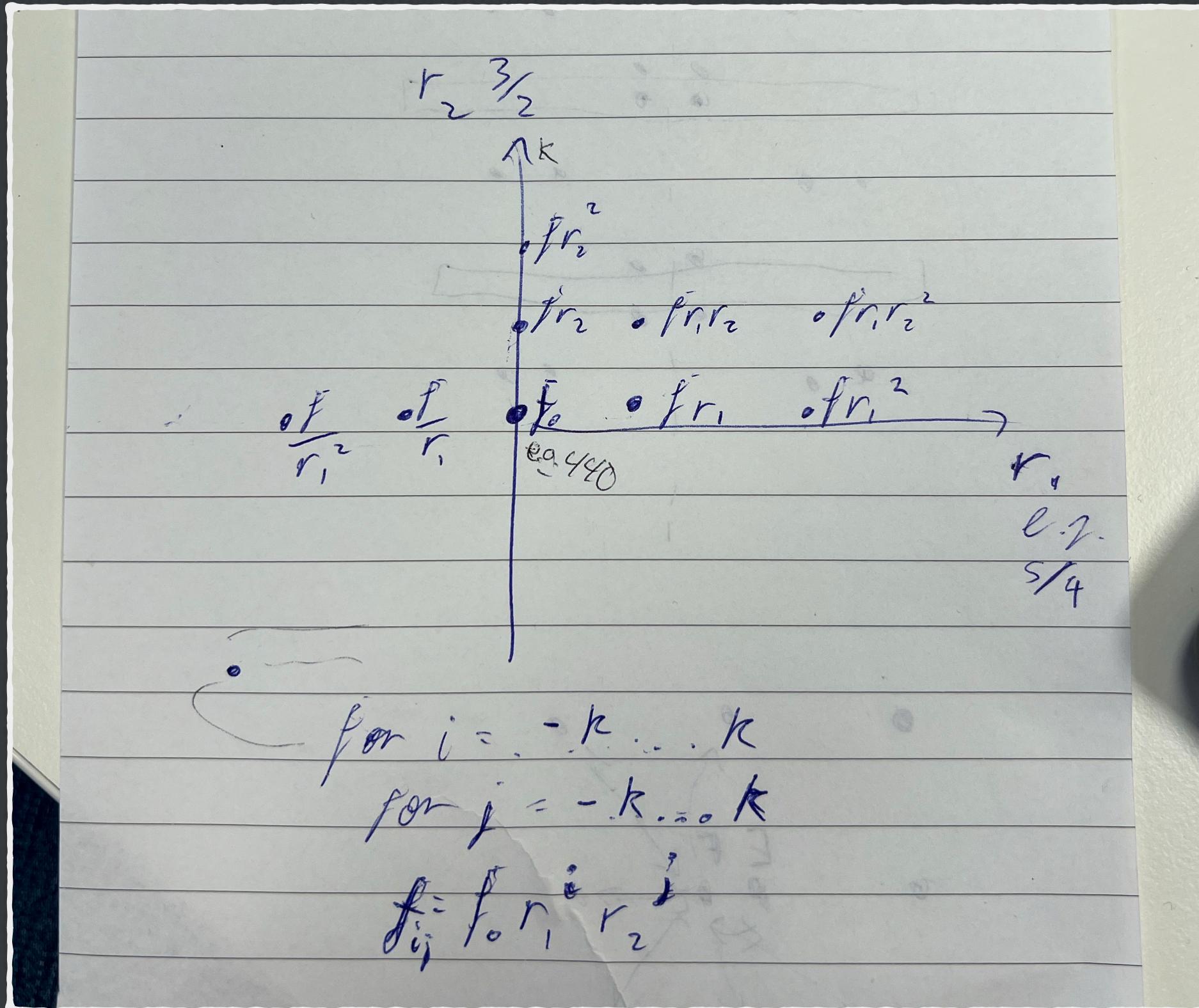
<https://generativemusic.com/bloom.html>

Bouwer, Anders, Simon Holland, and Mat Dalgleish. 2013.  
“Song Walker Harmony Space: Embodied Interaction Design for Complex Musical Skills.”  
Pp. 207–21 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing,  
edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.

Narushima, Terumi. 2017. *Microtonality and the Tuning Systems of Erv Wilson*. Routledge.

Magnusson, Thor. 2010. “Designing Constraints: Composing and Performing with Digital Musical Systems.” *Computer Music Journal* 34(4):62–73.  
Magnusson, Thor. 2019. *Sonic Writing: Technologies of Material, Symbolic and Signal Inscriptions*. New York, NY: Bloomsbury Academic.

# Tuning lattices



Tuning lattice calculation sketch by Alexander Szorkovszky

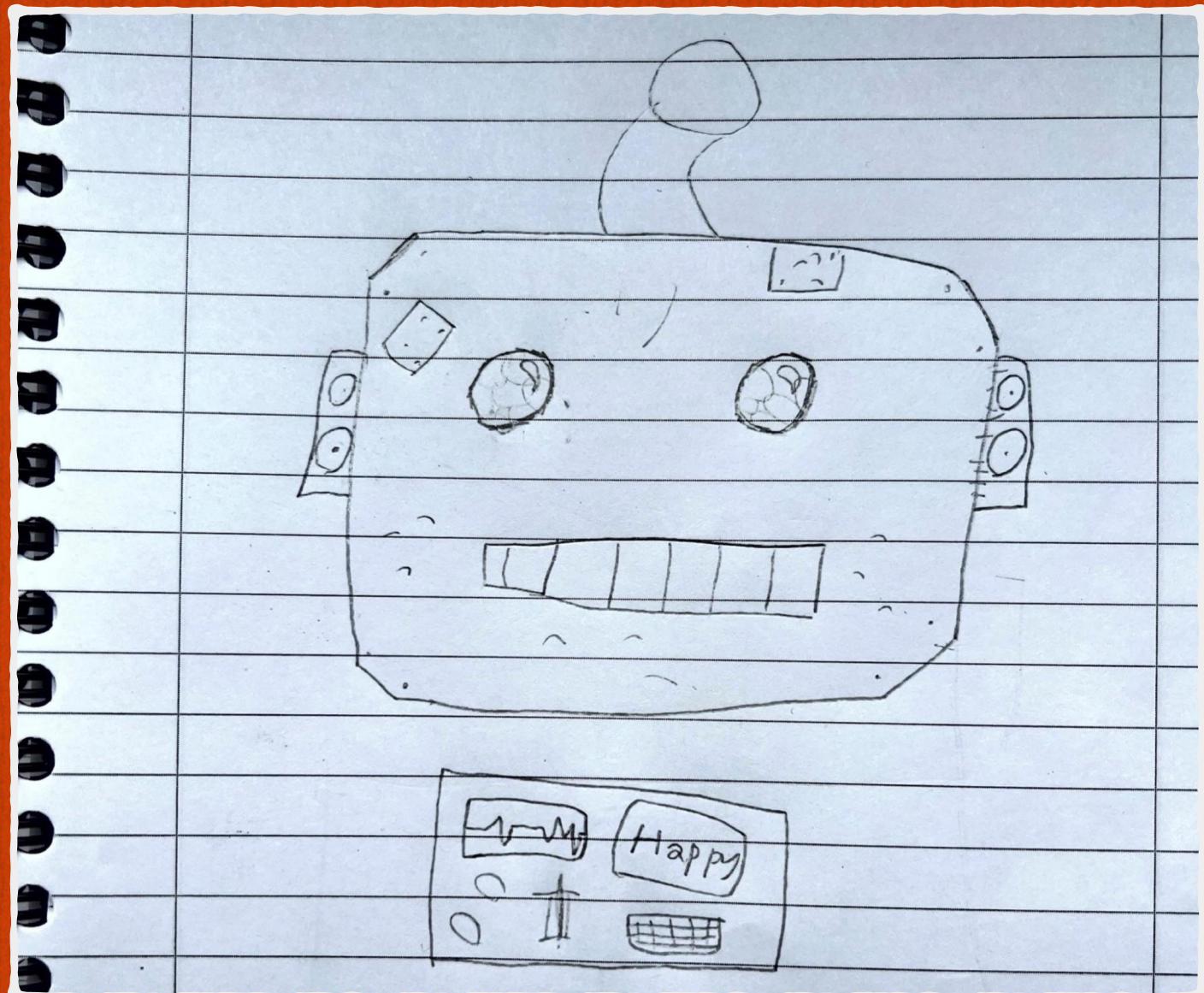
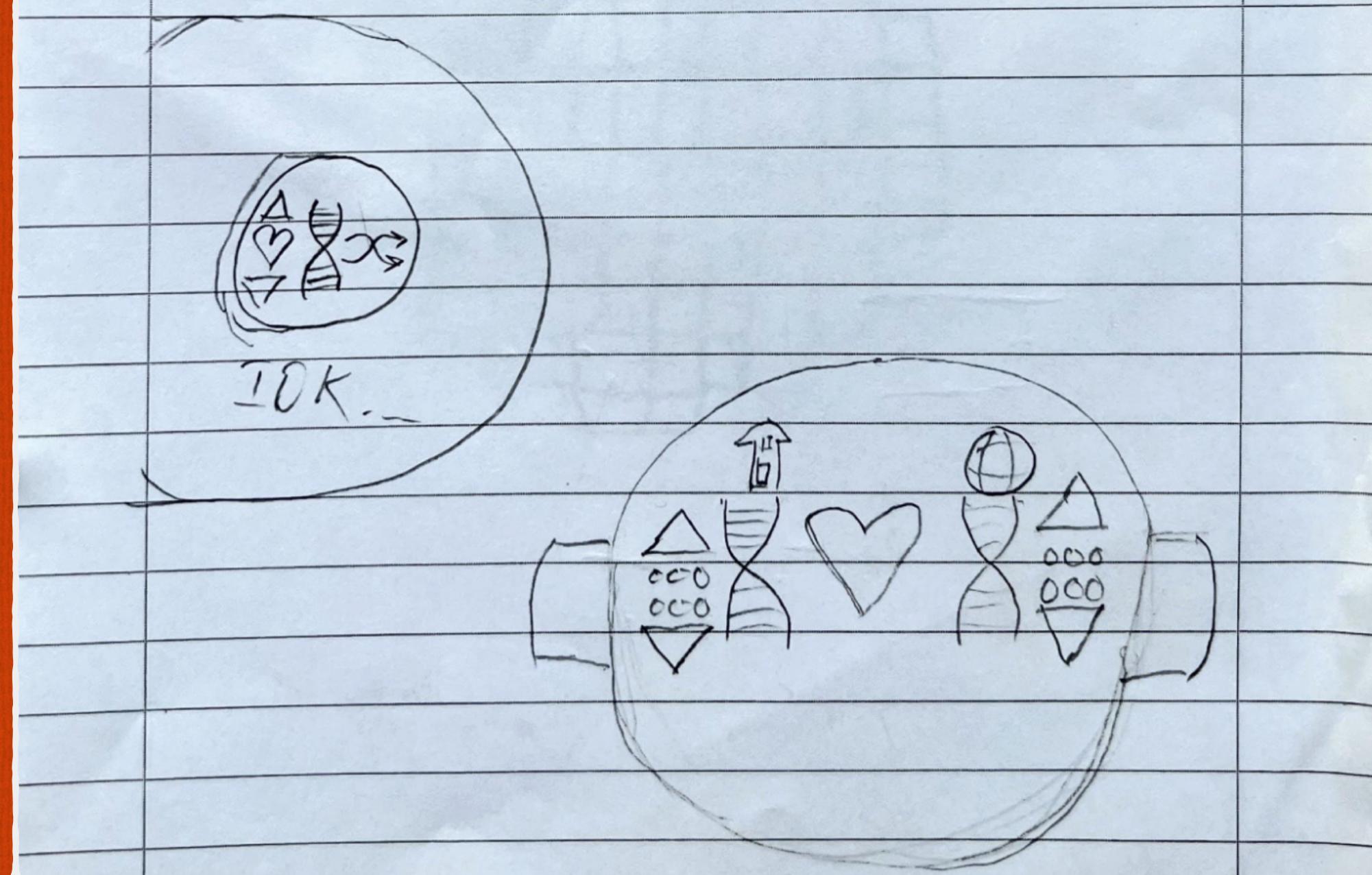
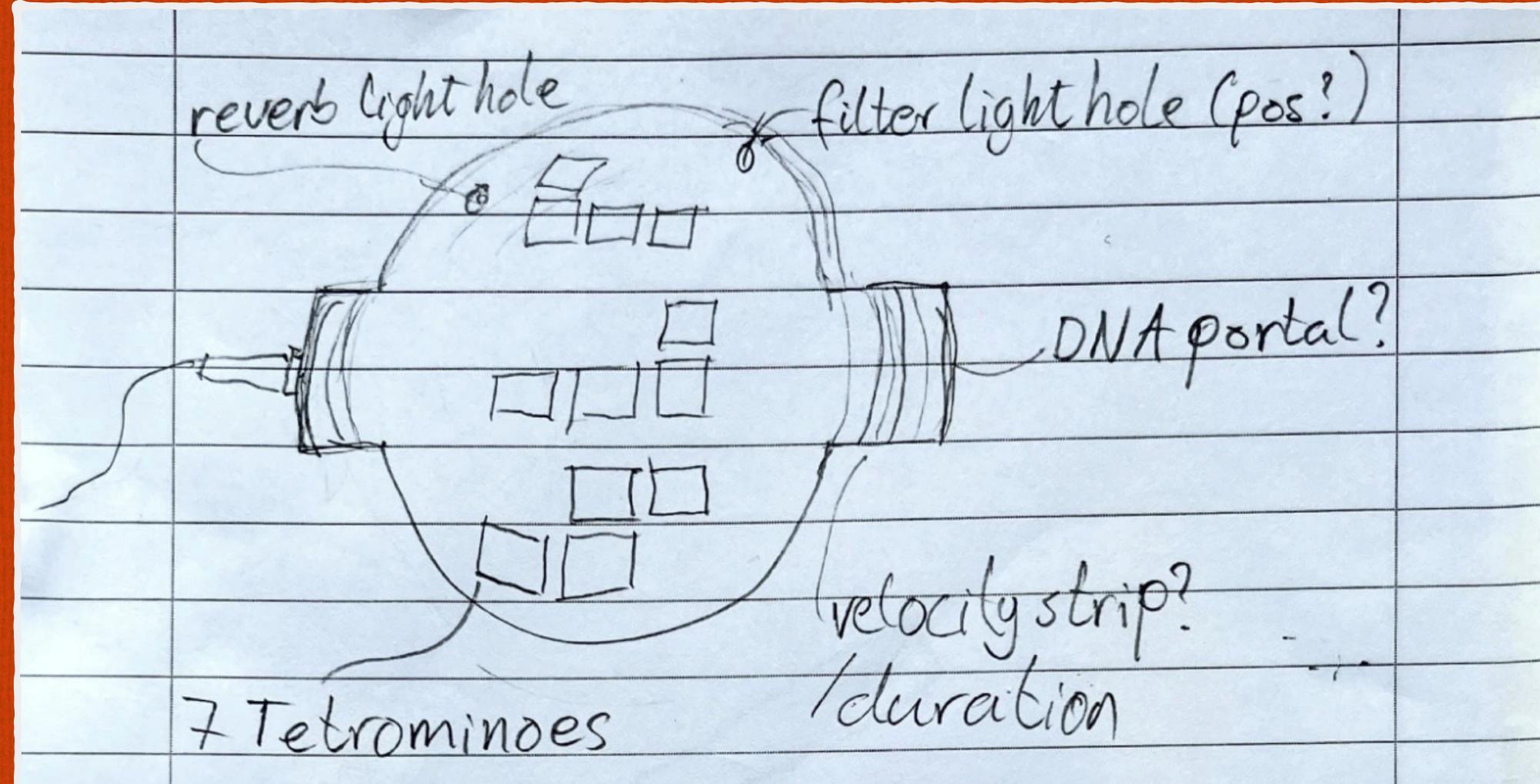
- The microtonality rabbit hole
- Ad-hoc tuning lattice calculation

Narushima, Terumi. 2017. Microtonality and the Tuning Systems of Erv Wilson. Routledge.

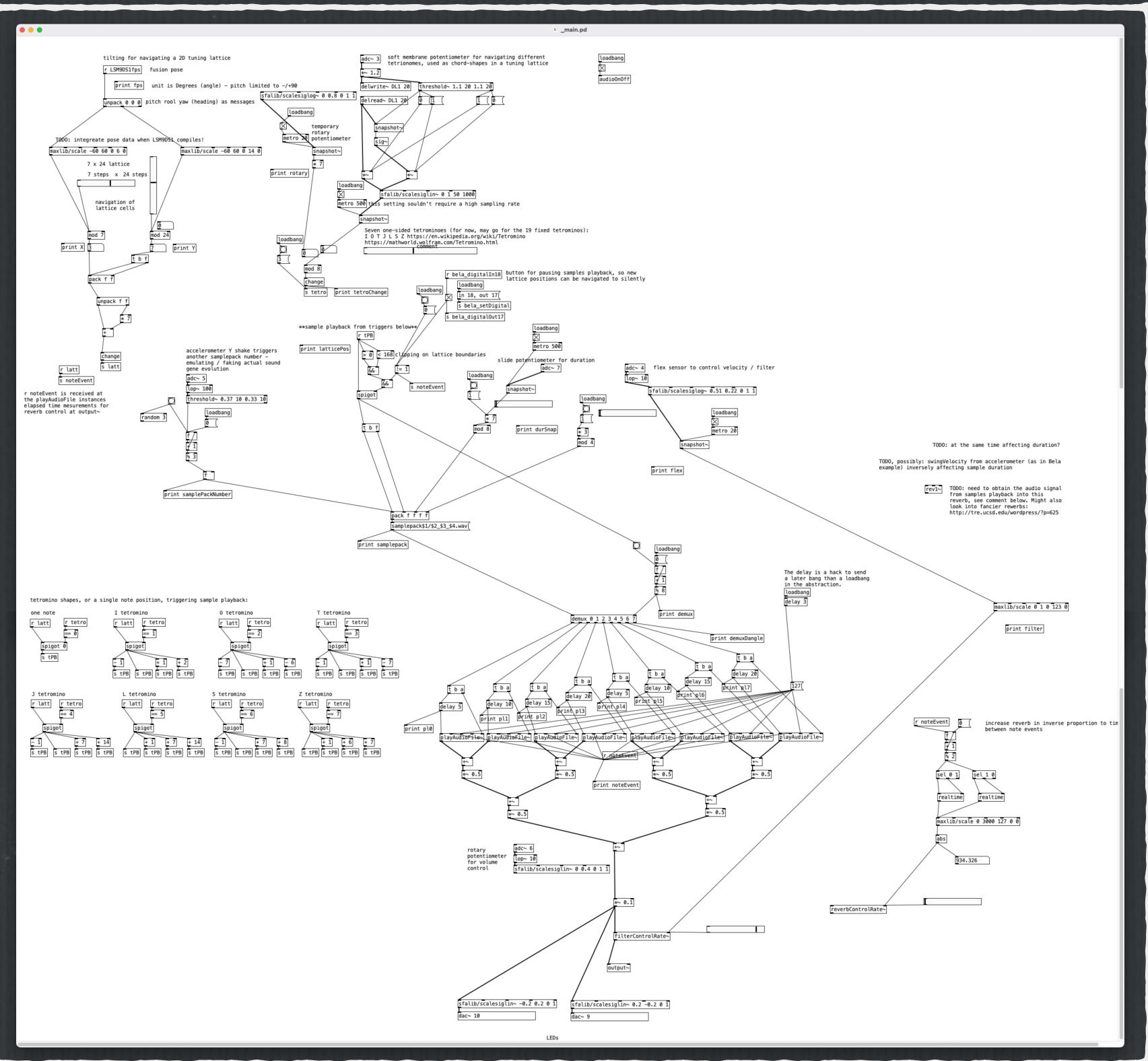
Taylor, B., & Bernstein, A. (2016). Tune.js: A Microtonal Web Audio Library.

<https://wilsonic.co>

<https://www.huygens-fokker.org/scala/>



# Sample loading



- Instead of actually evolving and rendering sound-genes
  - Buffer underruns
  - Software settings

# Soldering and sensor woes

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- First perfoboard unrecognised hardware
- Second iteration:
  - Solder and test one sensor before moving onto the next one
  - Sensor 5 a flatliner
  - Due to software settings!



# Evaluation

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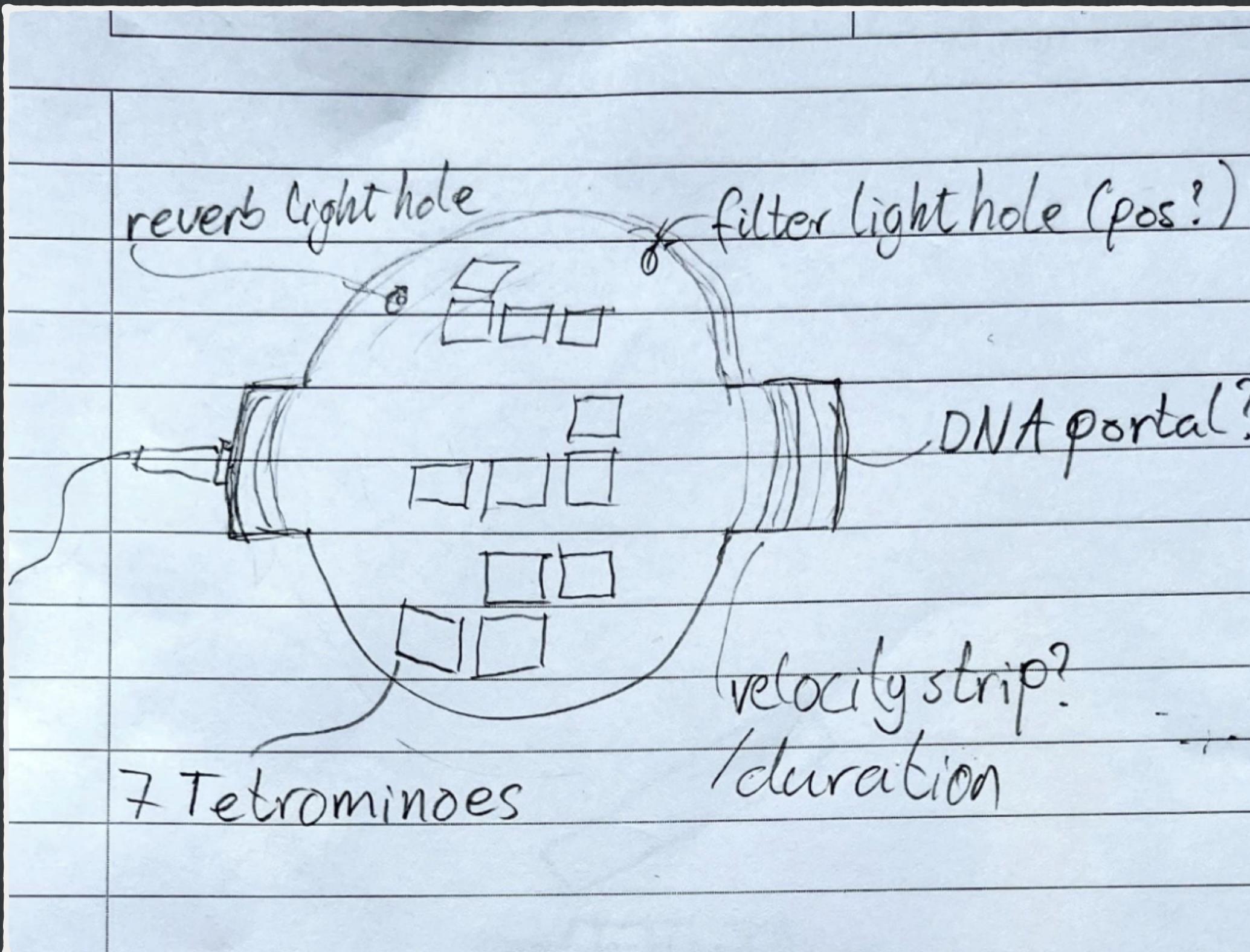


[https://en.wikipedia.org/wiki/Castle\\_in\\_the\\_Sky](https://en.wikipedia.org/wiki/Castle_in_the_Sky)

- Visualisation of tetromino forms required**
- for some conceptual model**

# Performer evaluation

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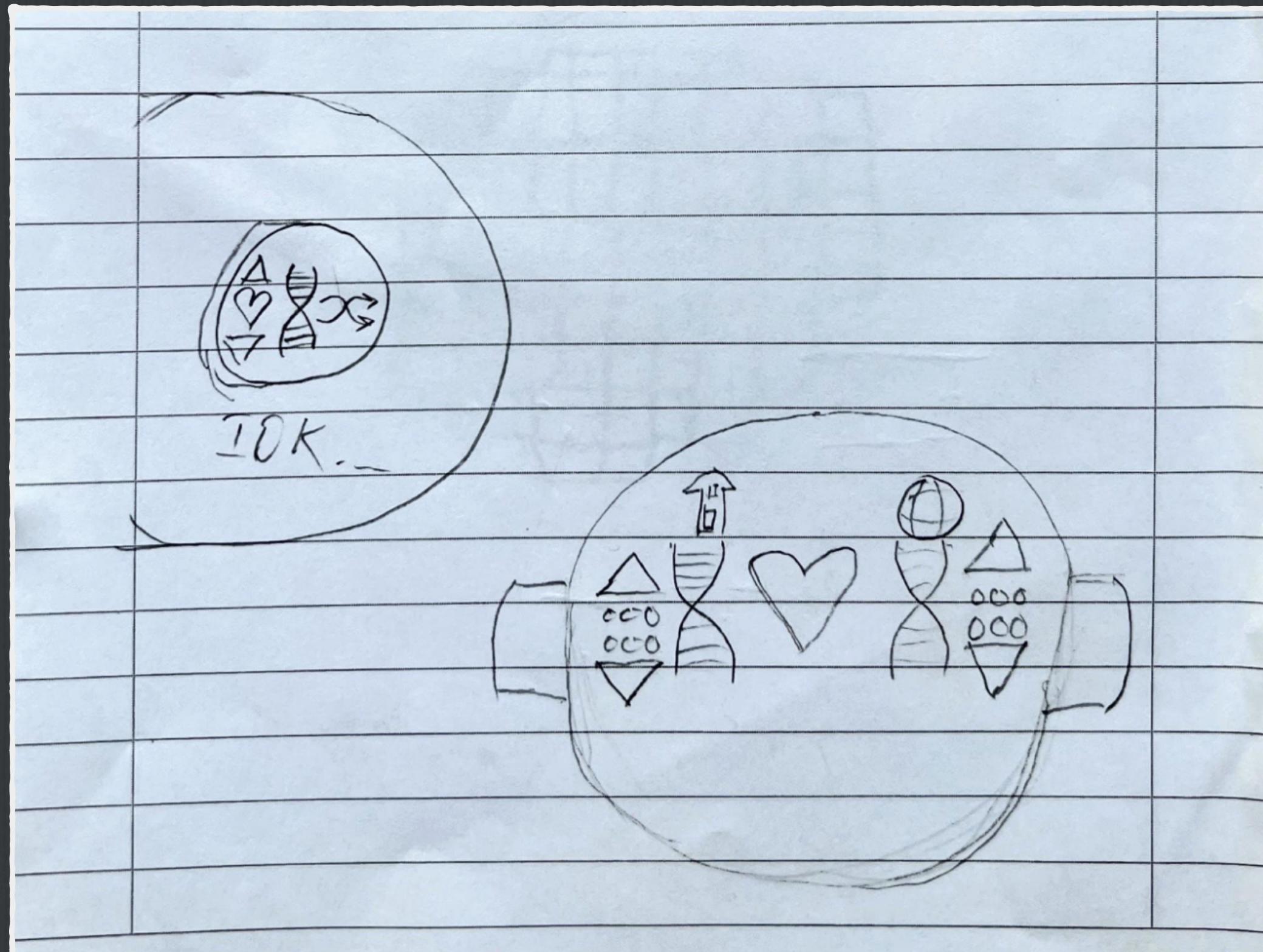
- Third hand for increased bandwidth

Cook, Perry R. 2009.

“Re-Designing Principles for Computer Music Controllers: A Case Study of SqueezeVox Maggie.” in NIME.

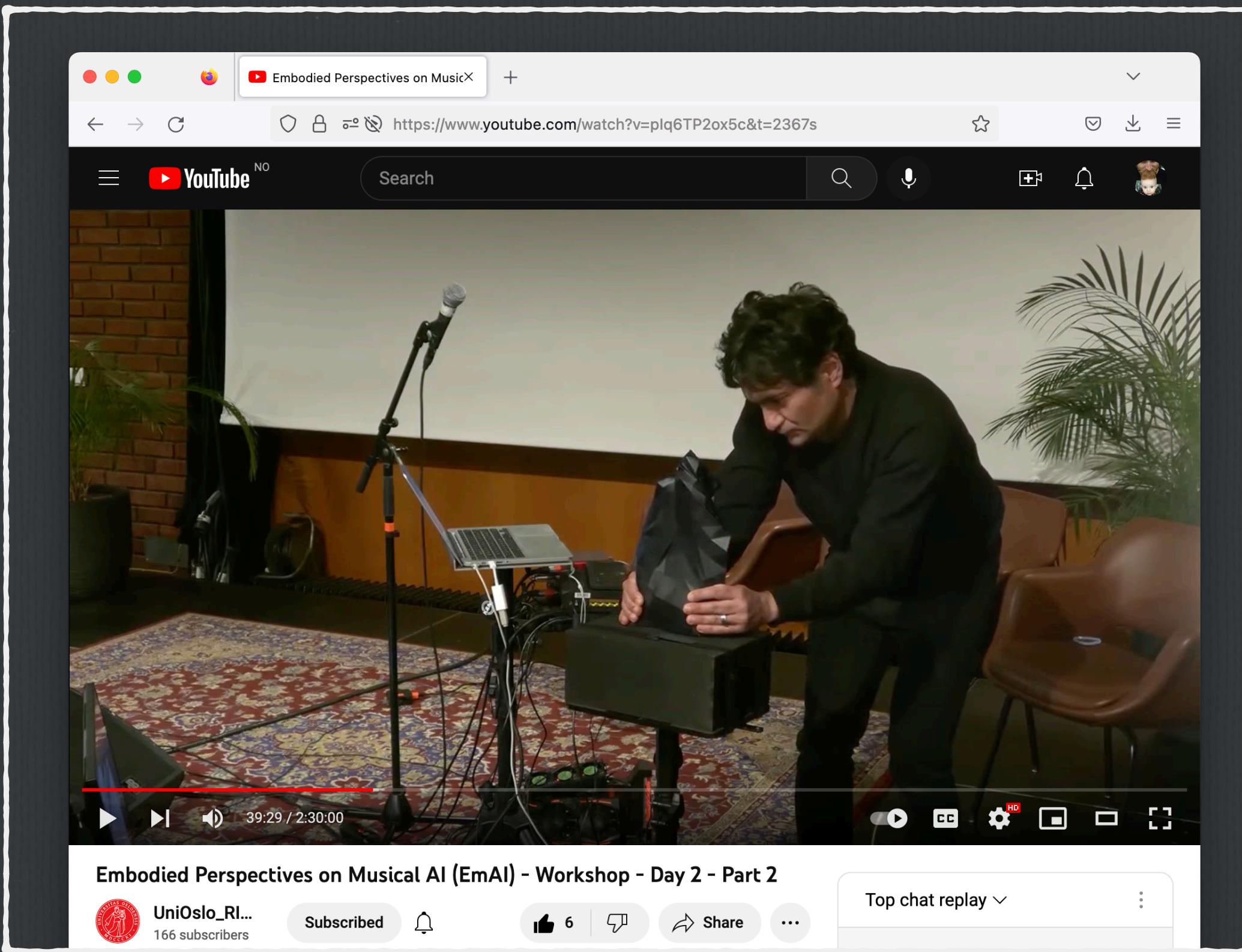
# Evaluation of evolutionary interaction

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- Shaking to evolve next individual
- What is the fitness function?
- Variation in sensitivity to shaking gestures

# Future directions



- Actually evolve genes
- rendering sounds real-time-ish
- move backwards and forward along evolutionary paths
- Perhaps think outside the box



<https://youtu.be/A1m3Xp4wVgY>

# Thanks

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- Bouwer, Anders, Simon Holland, and Mat Dalgleish. 2013. "Song Walker Harmony Space: Embodied Interaction Design for Complex Musical Skills." Pp. 207–21 in *Music and Human-Computer Interaction*, Springer Series on Cultural Computing, edited by S. Holland, K. Wilkie, P. Mulholland, and A. Seago. London: Springer.
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- Eno, Brian, and Peter Chilvers. 2009. "Bloom." Retrieved (<https://generativemusic.com/bloom.html>).
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