

# **r e s o n a n c e s**

for marimba and electronics

A piece by  
Maxwell Franko and Samuel Wheeler

2023

*Resonances* was initially composed as a collaboration between composer Maxwell Franko and percussionist Samuel Wheeler in Austin, Texas.

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After a closer listening, you can hear the fascinating sounds that appear out of the marimba beyond the intended pitch that's being played. Individual keys resonate on higher partials in the harmonic series, the combination of two close pitches creates a powerful frequency clashing, the lower register begins to disappear – favoring its higher partials, etc.

These ever-present sounds resonate so well together and have such beautiful movement in themselves, yet they need just a little push to be heard in the context of a performance. This piece focuses on these sounds, the room they are being played in, and, using live electronic processing, enhances them so that they become the central listening experience.

Using a performer-controlled Max MSP patch, pitch bending from minute increments to the full octave, a few moments of fixed media, and live-sampling of resonances, the performer accesses some the deeper sounds found within the keys of the marimba and puts them into focus for the audience.

## Equipment Needs

5-octave marimba

2 bass bows

4 soft-medium mallets

fabric cloth – to cover upper half of marimba

Max MSP (created on v8.3.1)

laptop

interface with at least 4 outputs if no mixer is available

4.1 speaker system – quadrophonic + 1 subwoofer – can be re-routed to stereo

on/off footpedal + MIDI controller if no USB to MIDI is accessible

(optional) electronic drum pad trigger

(optional) additional laptop stand or music stand as needed

## Performance Notes

- Throughout, the upper staff is representing only the left hand (LH) and the lower staff, the right hand (RH).
- When shown, the third staff is showing either the current processing in the electronics or what the performer should be doing to trigger that processing. All moments where the performer must trigger an electronic process are marked with a bold number (#) in a circle in the third staff.
- All mallet and bow changes are shown by little pictures of what the current hand should look like. Anything beyond that – *such as additional mallets for changes in tone and color* – are up to the performer to decide.
- While the tempo is marked as around  $Qu = 50$ , the performer can push and pull any moments as needed as long as enough time is given for the audience to hear the intricacies of the sounds – especially in the final section where the audience is meant to hear the slow change in resonance and frequency beating.

## Notation



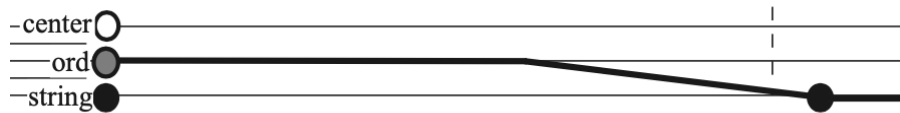
Block noteheads indicate the performer should be applying little to no bow pressure on the marimba. The result should be a very airy sound with light pitch if any at all.

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When bowing for an extended period of time, alternate bow takes up and down ad lib. Try to create as smooth of a connection as possible.

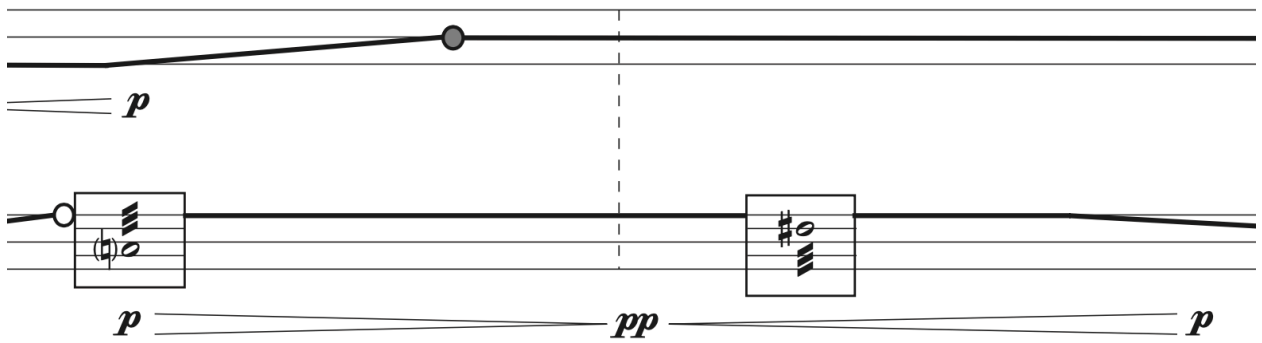
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In the final section of the piece, the three-line staff shows where the performer should be playing on each key on (LH) and (RH) separately. From top to bottom, the nodes are:

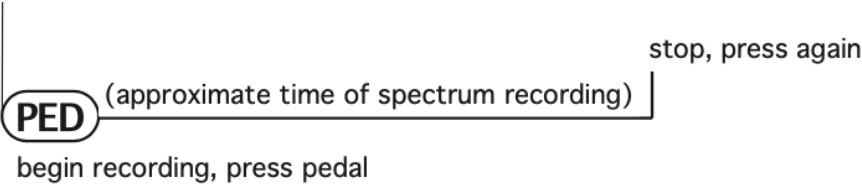
1. Center – a lot of high partials, a little bit of fundamental
2. Ord. – a lot of fundamental, not much of anything else
3. String – playing over the string, dampened sound, a lot of contact noise

....



In the final section, changes in pitch are indicated by individual boxes. The performer should change pitch when reaching the box, and while doing so, use the second mallet in hand to create a crossfade from the previous pitch. Until the next pitch is shown, remain on the same one, continuing to follow the node changes as they come.

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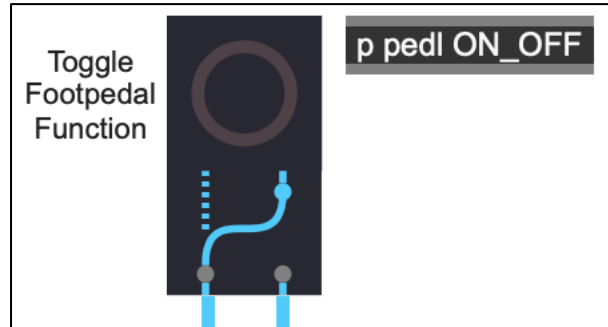


In the final section, these markings are shown to give an approximate time that the performer should press the footpedal to trigger the spectral recording. Like mentioned earlier, the amount of time is kind of arbitrary as long as enough time is given to capture the static recording of a pitch.

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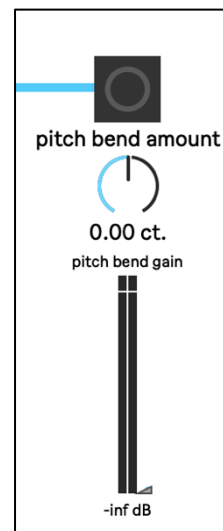
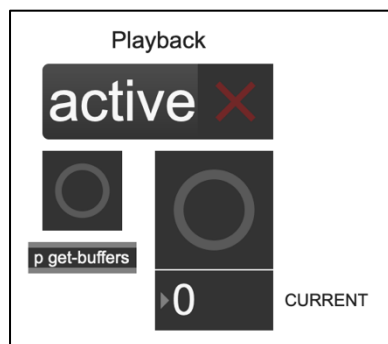
## Max MSP (built in v8.3.1)

The large *bang* object toggles the patch between two different modes that change how the footpedal is functioning.



**Mode 1:** the footpedal triggers a series of incremental pitch bends followed by a stop. Both stops and starts are indicated on the electronics staff. Each press of the pedal advances the cue counter linearly so be careful to only press when shown.

- The final pitch bend is a full octave and should remain on for the rest of the performance after it is triggered.
- A manual cue interface is included if the pedal stops functioning.



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marimba score


# resonances

for marimba and electronics

composed by  
MAXWELL FRANKO  
SAMUEL WHEELER

$\text{♩} = 50$  arco  
retake bow as smoothly as possible when needed (V ▢ V ▢...)

RH  Marimba

LH 

*mf* *mp* no dim. *pp*

arco, no tension with the bow

*mf* *pp* no cresc.

5

Mrb.

*mf* *mp* no dim. *p*

ord. strike with mallet at each new bow take

arco, no tension with the bow

*mf* *mp* *pp* no cresc.

9


Mrb.

*mf* *mp* no dim. *p*

ord. strike with mallet at each new bow take

arco, no tension with the bow

*mf* *mp* *pp*

+ mallet 

E.

cents 0 **1** -15 **2** stop

captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.



resonances

13

(V □ V □ ...)

Mrb.

ord. strike with mallet at each new bow take

*mf* *mp* *p* *pp*

E. 13 0 3 -25 stop 4 3/4

Mrb.

ord. strike with mallet at each new bow take

*p* *mf* *mp* no dim. *p* arco

captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.

E. 17 3/4 || 6/4 cents 0 5 -50 3/4

21

ord. arco (V □ V □ ...) alternate bow takes in both hands

increase bowing speed

cont.

4ths 3rds 2nds

Mrb.

ord. arco

*mf* *p* *mf* *p*

E. 21 3/4 4/4 6 6/4 (-50) stop 6/4

arco (V ▣ V ▣ ...) alternate bow takes in both hands

Mrb. **6/4** *(fp)* no dim., no cresc. ord. cont. increase bowing speed

Mrb. **6/4** *(mf)* *p* no dim., no cresc. increase bowing speed

E. **6/4** cents 0 **7** -25 **8** stop

captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.

about 6 - 8 bows (on accidental keys)

Mrb. **4/4** *(fp)* arco (V ▣ V ▣ ...) alternate bow takes in both hands ord. cont.

5ths 4ths 2nds

E. **4/4** cents 0 **9**

captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.

about 8 or 9 bows (on natural keys)

Mrb. **6/4** *(p)* no dim., no cresc. ord. to DBL MALLET **4/4**

6ths 5ths 2nds

E. **6/4** **10** stop

increase bowing speed

increase bowing speed

captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.

Mrb.

35

each of the 3 lines indicates a node on the key. As the line moves, slowly change to the next node shown in time. Stay on the same key until the 5-line staff appears showing the next key to move to.

pp

pp

E.

35

fixed media D sustain

Mrb.

39

mf

E.

39

Mrb.

43

mf

p

E.

43

46 arco, connect bow takes

no dim., no cresc.

- bow

Mrb.

E.

fixed media B sustain

octave pitch bend (8vb) - leave on

the pitch bend is fixed to gradually emerge around 3 minutes later. it can vary where the performer is at in the piece when this happens.

49

Mrb.

E.

mf dim.

53

Mrb.

E.

mp

p

pp

~ 3 sec

# resonances

6

57

Mrb.

center ○  
ord ●  
string ●

*pp* *p* *pp*

always overlap the new shown pitch with the current pitch being played

E. 57

footpedal is now functions as a trigger to start pitch resonators at a particular moment in time.

leave only the dry signal amplified until m. (70 something)

58

Mrb.

*p* *pp*

*pp* *p*

E. 58

15

59

Mrb.

*p*

*pp* *p*

Mrb.

60

(b $\flat$ )

( $\flat$ )

pp

mp

p

E. 60

16

Mrb.

61

p

mp

p

Mrb.

62

mp

p

pp

E. 62

17

resonances

8

63

Mrb.

Mrb. score for exercise 63. It consists of two staves in bass clef. The top staff starts with a note on the second line (B2) with a flat sign. The bottom staff starts with a note on the second space (D3) with a sharp sign. A vertical dashed line is placed between the two staves. The top staff has a dynamic marking *mp* with a hairpin that tapers to the right. The bottom staff has a dynamic marking *p* with a hairpin that tapers to the right. A long hairpin under both staves indicates a dynamic change from *mp* to *p* across the dashed line.

64

Mrb.

Mrb. score for exercise 64. It consists of two staves in bass clef. The top staff has a note on the second space (D3) with a sharp sign, followed by a box containing a musical staff with a sharp sign and a note on the second space. The bottom staff has a note on the second space (D3) with a sharp sign, followed by a box containing a musical staff with a sharp sign and a note on the second space. A vertical dashed line is placed between the two staves. The text "a small lift, ~2 sec" is written above the bottom staff with a curved arrow pointing to a note on the second space. The dynamic marking *pp* is written below the bottom staff. A circled number "18" is located at the bottom right.

E. 64

Mrb.

Mrb. score for exercise 65. It consists of two staves in bass clef. The top staff has a note on the second space (D3) with a sharp sign, followed by a box containing a musical staff with a sharp sign and a note on the second space. The bottom staff has a note on the second space (D3) with a sharp sign, followed by a note on the second space (D3) with a sharp sign. A vertical dashed line is placed between the two staves. A pair of crossed mallets is drawn above the top staff. The dynamic marking *mp* is written below the bottom staff.

resonances

65

Mrb.

#0

pp

pp

66

Mrb.

mp

p

E. 66

19

67

Mrb.

p

mf

mp

mf





71

Mrb.

a small lift, ~2 sec

by this point in the piece, remain soft enough that the upper harmonics are quiet. along with the 8vb pitch processing, emphasis should be on the low end rumble.

Mrb.

E.

73

Mrb.

74

Mrb.

74

*ppp*

*ppp*

0

0

Detailed description: The image shows a musical score for Maracas (Mrb.) in two staves. The top staff begins with a treble clef and a key signature of two sharps (F# and C#). The bottom staff begins with a bass clef and a key signature of two flats (Bb and Eb). Both staves start with a measure containing a note with a fermata. The first measure is marked with the dynamic *ppp*. A vertical dashed line is placed between the first and second measures. The second measure contains a note with a fermata, also marked with *ppp*. The notes in both staves are connected by a horizontal line, indicating they are played together. The score ends with a double bar line.

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