

ABSTRACT

Title of dissertation: *INCIPIT* FOR FLUTE AND COMPUTER
Hyun Kyung Kim, Doctor of Musical Arts, 2005

Dissertation directed by: Professor Robert Gibson
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Recent advances in digital technology have made it possible for musicians to interact in live performance with real-time digital audio signal processing generated from a personal computer. As a result, composers have been able to develop sophisticated algorithms and software for sound generation and control, taking advantage of real-time human/computer interaction to emulate the expressive responsiveness of traditional musical ensembles.

Incipit for Flute and Computer requires an Apple PowerBook computer, a compatible four-channel audio interface and the digital audio signal processing application Max/MSP by Cycling74. The piece is structured so that performance parameters generated by the computer are triggered by the amplitude, pitch and duration of the flute sound, or by a foot pedal (MIDI trigger). *Incipit* is truly interactive in that the piece evolves in response to and because of the performance gestures of the flutist.

An *incipit* ("here begins," Latin) is typically found on the opening pages of early manuscripts to mark the beginning of the text. These openings have a unique appearance that often includes elaborate and creative letterforms. In my composition *Incipit*, various

short initial motives played on the flute form thematic material used to delineate the structure of the piece and are further developed through various real-time audio digital signal processing (DSP) algorithms.

In the first section of *Incipit*, the method of capturing the performance gestures in digital format and the musical responses of the computer are created using `tap.shift~`, a Max/MSP object written by Timothy Place, to detune the incoming sound of the flute. The computer senses the flute's amplitude and triggers the detuning action when the performer plays a passage loudly (specifically, a Musical Instrument Digital Interface (MIDI) velocity over 65). A Virtual Studio Technology (VST) plug-in is then applied to delay and further enhance the effect. The second section uses algorithms written by the composer controlling the Max/MSP objects `sfplay~` and `groove~` to play prerecorded sounds randomly. Here the computer does not respond to the flute, but rather provides a ostinato over which the performer improvises passages derived from suggested motives. The third section uses the `fiddle~` object, written by Miller Puckett, the creator of the Max/MSP, to track the pitch and amplitude contours of the incoming sound. Specific pitches at the appropriate amplitude trigger the computer to play prerecorded sounds along with the flute.

INCIPIT FOR FLUTE AND COMPUTER

By

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Incipit

for Flute and Computer

Hyun Kyung Kim

A ♩ = 40-50

Flute

Normal to Flutter (Echo Like)

ppp p mf mp p mp p

6 Normal to Vibrato (slow-fast-slow)

mf p mp cresc. mf mp

(Computer Patch - Detune)

9 Hollow Tone Slap Tongue Slap Tongue Flutter to Normal

mp cresc. f ff mf mp

13 Slap Tongue tr♯ Slap Tongue Whistle gliss. tr♯

ff mf f f ff mf cresc. f

17 Hollow Tone 123# 2345 Hollow Tone Slap Tongue

mp mf mp 3

21 Flutter Flutter to Normal

mf mp

25 Normal to Flutter

p mf mp

29 *Hollow Tone Normal*
mf *mp* *mf* *mp* *p* *ff*
3 *(Rapidly)*

33 *Hollow Tone*
fp *mf* *mp* *cresc.* *mf* *mp* *mp*
3 *5*

38 *Flutter to Normal to Vibrato (slow-fast-slow)*
fp *mf* *mp*

42 *Normal to Flutter* *Flutter* *Flutter to Normal*
mf *mp* *mf* *f* *mp*

47 *Flutter* *Flutter to Normal to Flutter*
mf *mp* *mf* *mp*

B

52 (* Improvisation - Suggested Flute Melody) *figure 1*
(Computer Patch - Detune) *pp* *f* *sub.p* *mf*

56 *figure 2* *Flutter* *Flutter to Normal*
mp *f* *6* *6*

59 *figure 3*
mf *3*

61 *figure 4*
mp *f* *ff*

63 **figure 5** *Flutter* *Flutter*
mf *mf* *f mp f mp*

66 **figure 6** **figure 7**
f *mf* *mp*

68 *Flutter to Normal* **figure 8**
mf *mp*

71 **C**
(Computer Patch - Aiff Files) mf

6 random rain (through out) 4 shuffle 7 4 shuffle 7

75

5 >60

79 *Flutter* *Normal to Flutter* *Flutter*
ff *mf* *fp* *mf* *f*

7 5 >60 7 5 >60 4 shuffle

83

8 4 shuffle 7 4 shuffle 5 >60

86 *Slap Tongue* *Slap Tongue*

mf *f* *f* *mf*

[6] rain (through out) [5] >60 [5] >60 [7] [4] shuffle

89

Normal

[5] >60 [7] [4] shuffle

92 *to Flutter to Normal* *Normal to Flutter*

mp *ff*

[3] flutter [5] >60 [8] [4] shuffle

96 *to Normal*

mf *mp* *mf*

[5] >60 [6] rain [4] shuffle [5] >60

100

mf

[8] [4] shuffle [7]

103

mf

[6] rain [7]

105 *Flutter* *to Normal* *to Flutter*

f

5 >60 4 shuffle 7 5 >60

108 *Slap Tongue*

mf *f* *mf* *pp*

5 >60 8 # 3

111 *Flutter* *Normal*

f *mf*

5 >60 7 4 shuffle 4 shuffle 7 5 >60

114 *to Flutter* *to Normal*

ff *mp* *mf*

8 # 5 >60 2 tail

A

117 *Hollow Tone* *123#2345* *Hollow Tone* *Slap Tongue*

mp *mf* *mp*

(Computer Patch - Detune)

3

121 *Flutter* *Flutter to Normal*

mf *mp*

3 3 3

125 *Hollow Tone* *Normal*

mf *mp* *mf* *mp* *p* *ff*

3 3 3 (Rapidly)

128 *Hollow Tone*

fp \triangleleft *mf* *mp* 3 *cresc.* 5 *mf* \triangleright *mp*

132 *Flutter to Normal to Vibrato (slow-fast-slow)*

fp \triangleleft *f* \triangleright *mp*

136 *Normal* *Flutter* *tr* *Flutter* *Flutter to Normal*

mf *mp* \triangleleft *mf* *f* \triangleright *mp*