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 \( \frac{4}{4} = 40-50 \)

Flute

Normal to Flutter

(Echo Like)

Normal to Vibrato (slow-fast-slow)

(Computer Patch - Detune)

Hollow Tone

Slap Tongue

Slap Tongue

Flutter to Normal

Slap Tongue

Whistle

Flutter

Flutter to Normal

Normal to Flutter
Hollow Tone  Normal

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

Flutter to Normal

(Fluxus)

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(* Improvisation - Suggested Flute Melody)

(Computer Patch - Detune)
Flutter to Normal

(Computer Patch - Aiff Files)

random rain (throughout)