

Workshop/Tutorial

Title Machine Typography



Instructor Taekyeom Lee

Program Schedule

Date/Time: June 23(Sun.)/14:00-18:00

Venue: Training room 1, ACC Archive&Research(B4)

Target Audience

- Anyone interested in learning how to use a 3D printer as lettering or drawing machine.
- Anyone interested in gaining a better understanding of G-programming language which is commonly used for Computer Numerical Control (CNC) machines. So, they can use machines as an extension of their hands
- Someone who wants to combine machining, typography, and coding

If participants own 3D printer and/or have some experiences with CAD and 3D printing, that would be great (recommended, but not restricted).

Number of participants (min./max) 8-15 people

Prerequisite for participants

The supplies that participants need will be their laptops, papers (any size. white or any colors), and various writing instruments (for example, color gel pen, sharpie, color pencil, etc). Bringing experimental materials are always encouraged.

If participants can bring their own designs they want to write with the machine, that would be great.

If participants are familiar with CAD software, they can use any software. But if participants have not used any CAD software, it is recommended to visit <https://www.tinkercad.com> to finish the introductory tutorials and get familiar with the interface (recommended, but not restricted).

I will bring other necessary supplies: machine, Mac laptop, 3D printed pen mounts, different pens, papers, masking tape, zip ties, rubber band, etc. Video demo and handout would be provided for the participants.

Abstract

We have had a long history of handwriting from prehistory up to this day although the importance of handwriting has diminished with the development of digital technology. During the digital age, many analog activities are simulated on screen, handwriting included. My research explores unconventional methods of creating the type with techniques unique to type design by customizing an open source 3D printer as a lettering machine. This project was accidentally found while building and playing with the DIY ceramic 3D printer as a new tool for typographic practice in the post-digital age. This workshop will provide instructions and hands-on experience on how to turn 3D printers into writing machines. Designers have used premade tools as it is not easy to create their own. Designer as a toolmaker, I have built my tools including custom 3D printers to print three-dimensional ceramic type. While I was building my printers, I used a pen to calibrate the printer and realized that the 3D printer could be turned into a lettering machine.

The letterforms are drawn by using the G-programming language called G-code that is widely used for computer-aided manufacturing. The G-code could be generated from STereoLithography file or Bézier curve; the code could be manually written or edited as well. For example, to draw a simple 40mm X 40mm square, you can use Rectangle Tool and draw the box in Adobe Illustrator. We cannot see the complex algorithm behind the screen as Illustrator translates the computer language and only show the simplified version. On the other hand, G-code shows the raw data in a different programming language to draw the box.

The G-code could be generated and manually written/edited as well. For example, to draw a simple 40mm X 40mm square, one can use Rectangle Tool and draw the box in Adobe Illustrator. We cannot see the complex algorithm behind the screen as Illustrator translates the computer language and only show the simplified version. On the other hand, G-code shows the raw data to draw the box. G-code looks like this:

```
G28
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```
G1 X20 Y20
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```
G1 Z0.100
```

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G1 X-20 Y20 Z0
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G1 X-20 Y-20 Z0

G1 X20 Y-20 Z0

G1 X20 Y20 Z0

If the square needs infill patterns, the code would be more complicated and more extended. To generate the G-code, several different pattern options could be used: Rectilinear, Line, Concentric, Honeycomb, 3D Honeycomb, Hilbert Curve, Archimedean Chords, and Octagram Spiral. I found a way to generate custom g-code from Bezier curve using a plugin for Rhino called Grasshopper. There are more advanced options for various letterforms and writing instruments, even brush pens which need upstrokes and downstrokes.

This workshop will provide a way to translate the digital data into the typographic form, line by line, drawn on paper. Also, the use of digital fabrication pushes the boundary of the medium in typography both regarding concept and materiality.

Short Biography of the Organizers

Taekyeom is an interdisciplinary artist although he prefers to introduce himself a designer using artist's material and artistic sensibility. He is currently an Assistant professor of Graphic Design at Appalachian State University in Boone, NC. He received an MFA degree in Graphic Design from the University of Illinois at Urbana-Champaign. He has made three-dimensional type as a series of typographic explorations to strive challenge and seek a new way to create tangible type in three-dimensional space.

As a part of the research, he built a self-build 3D printer and designed his own paste extruders to produce intricate 3D ceramic type and objects. Currently, he is using custom-built machines not only to print but to write various letterforms. His research has drawn interest nationally and internationally. His interests in graphic design are not solely focused on unconventional typography but also explore a diverse area of interests and experience.