# Robotics

## Contents

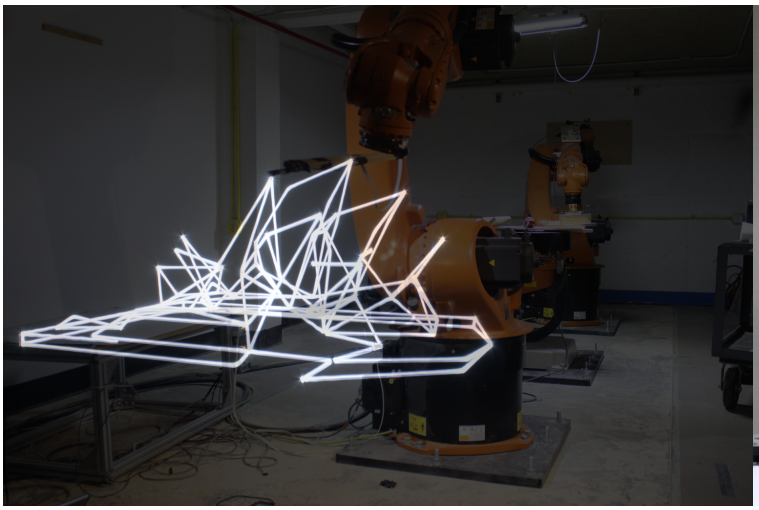


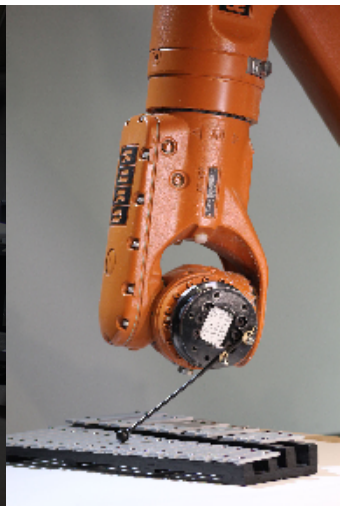
### Shortcuts

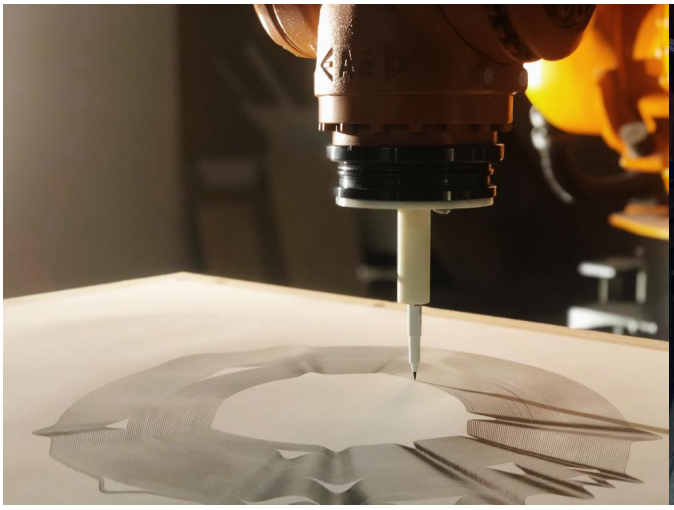
- **Resources for Learning More**

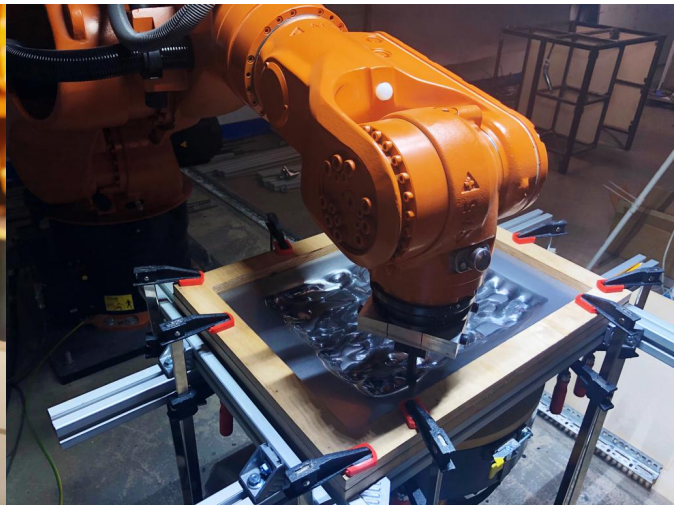
## About

The School of Architecture Robotics Lab is a place for creative exploration and practical realization of advanced digital fabrication methods. We work to foster an environment of curious exploration and offer a wide array of tools and support for School of Architecture students, faculty, and staff to realize their creative interests. Using **Kuka Kr60** industrial robot arms and a **DKP400** two-axis positioner, the robotics lab is equipped to allow engaged participants to prototype tools and undertake a variety of tasks using 7 axes.









## What We Do

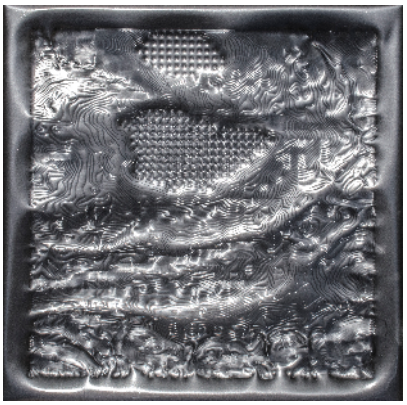
At the UT Robotics Lab, through our continuous research into robotics and design, we have developed various custom tools and work-flows using a variety of scripting languages such as ***Grasshopper, Python, VBA***, **C#** and others. Students and faculty are encouraged to get certified and join us in using the following processes (or developing new ones!):

- Drawing
- Extruding
- Dabbing
- Incremental Metal Forming

Currently, robots are programmed primarily using the **KUKA PRC** plugin for grasshopper to produce a set of toolpaths to follow. Each of the pre-defined tasks above has its own dedicated workspace which allows the KUKA PRC to translate virtual space in Rhino 3D to the real world setup. Instead of writing code, simple function-blocks are connected with each other and the results immediately visualized. This instantaneous feedback allows the acceleration of the process from the programming environment to the robot, or from design to fabrication. Our current KUKA PRC scripts accept MESHES and LINES and can be used with some of the end-of-arm tools we have developed in-house. Some additional tools are available to all faculty and students with a minor lead time for tool changing and preparation:

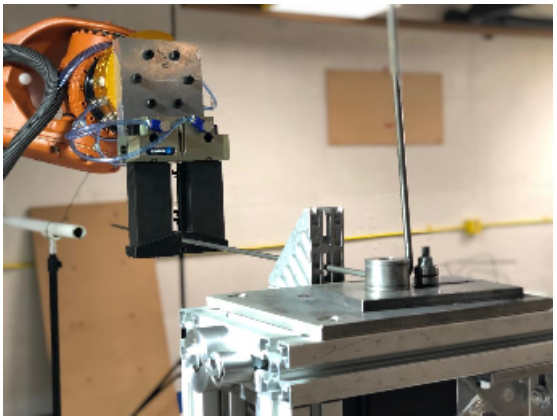
- Heat gun forming
- Milling
- Gripper functions

The robotic arm's versatility allows it to become a completely different tool using a simple change in the end-effector. Whether a tool is custom-designed or off-the-shelf, we have the capacity to do almost anything robots are capable of. Our research is aimed at blurring the line between robots and design, and the lab is at your disposal for your own projects toward those ends.



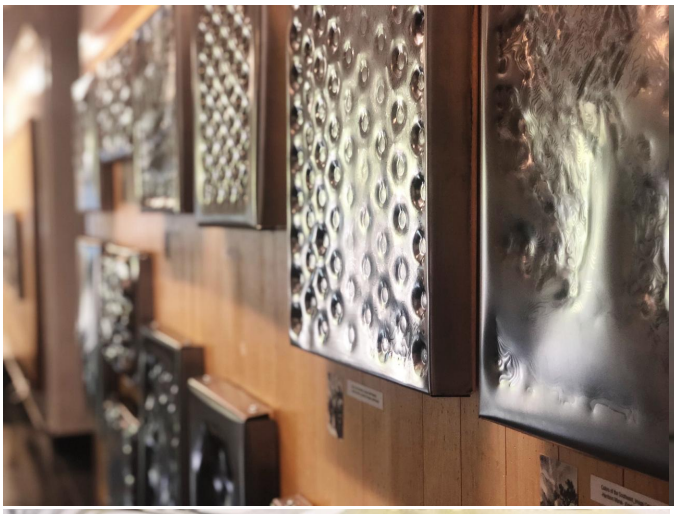
**Incremental Metal Forming**

**Heat Gun Forming**



**Rod Bending**

**Wood Milling**



Exhibition (1)

Exhibition (2)

Multilayered Pen Drawing

# Support

- All support for Robotics is provided by TRIG
  - SUT 1.120
  - trig@utexas.edu

# Documentation

## How-to Articles

| Title | Last Updated |
|---|---|
| Cutting with the Band Saw | |
| How to Manually Move the Robot Arm Using the Teach Pendant | |
| Python Robot Control | |

## Policies

| Title | Last Updated |
|---|---|
| Robotics Policies | |

## Examples

| Title | Last Updated |
|---|---|
| KUKA Programming KRL Examples | |

- Running A Basic KUKA Program
- Touch Screen Calibration
- Turning On and Signing In to the KUKA Arms
- Multi-Axis Milling
- Playing Music Using the Robots

## Processes

| Title | Last Updated |
| --- | --- |
| Calibrate a New Tool | |
| Dabbing Algorithm | |
| Flange Template | |
| Notes for Grasshopper/KUKA PRC Files | |
| Resources for Learning More | |
| Running an SRC File From USB | |
| Understanding Robots | |
| Understanding World and TCP Coordinates | |
| Using WorkVisual to Connect to the Robots | |

## Troubleshooting

| Title |
| --- |
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