Curving

ROBOTIC HOT-WIRE CUTTING

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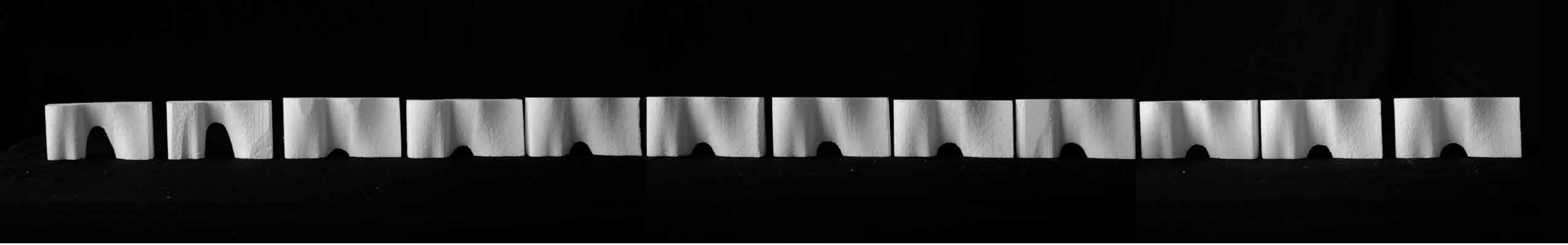
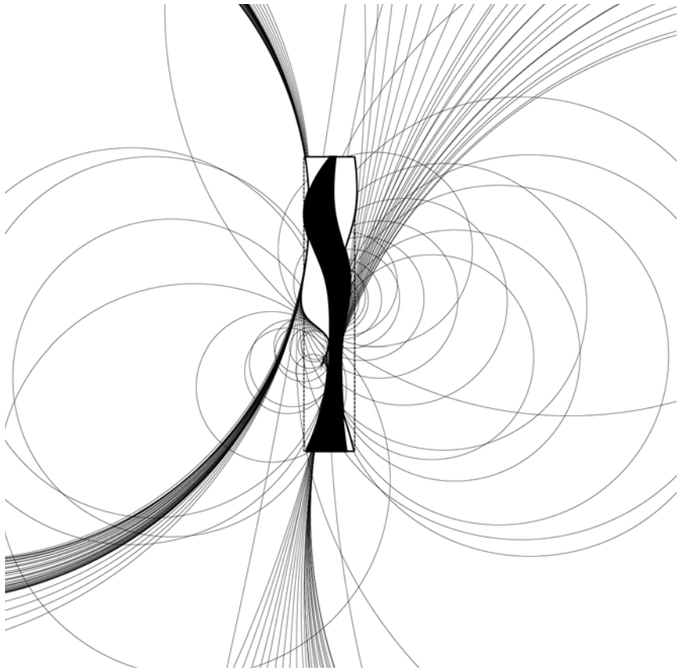
Applicant's Role: design generation, robot tool-path generation, robotic hot-wire cutting
Instructor: Caitlin Mueller, Justin Lavallee

This study aims to achieve precision in robotic hot-wire cutting. The test model is generated from two curve cuts. The intersection of the developable surfaces from the two cuts is optimized to be perfect half circle in digital computation. Mapping the computed curves to the robotic motion, the Kuka 7-axis robot is able to move the foam block through hot-wire to achieve the optimized two curve cuts. The challenges of this study are: 1) optimizing the two curve cuts that intersecting as half circle; 2) matching tool center, contact point with cutting block, cutting trajectory with hot-wire.

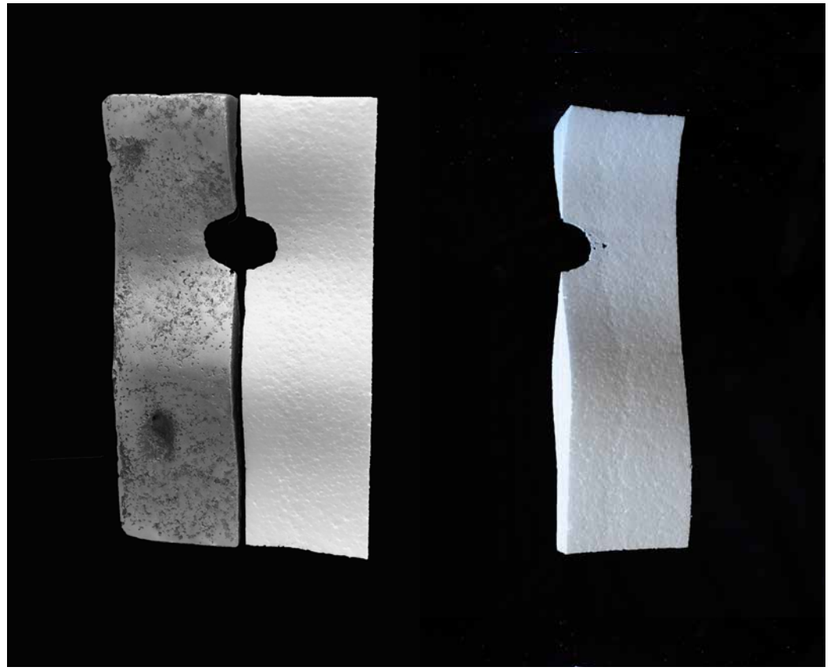


results from fine tuning tool speed, hot-wire intensity

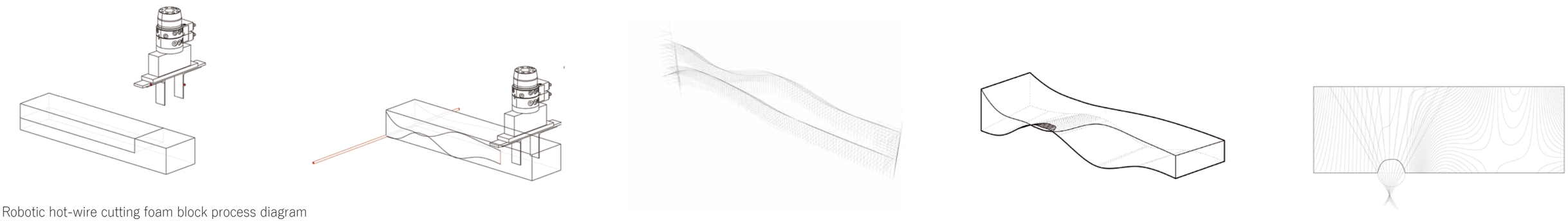
Long exposure image of the whole cutting process



Geometry generation, computation optimization



Curve cut foams+ aluminum cast



Robotic hot-wire cutting foam block process diagram