TURBOJET ENGINE TEST STAND

DANIEL BACH AND GARY GO ME '15
ADVISOR: GEORGE DELAGRAMMATIKAS

Turbojet engines are widely used as teaching tools in engineering education. The Cooper Union Automotive Lab possesses a small turbojet engine for experimentation purposes. A test stand is necessary to conduct experiments with this engine. Commercial test stands are very costly. A low-cost custom test stand was designed and built to provide a platform for turbojet experimentation. First, a baseline test stand was constructed to get the engine up and running. After a few successful test runs, the test stand was modified to incorporate a load cell for measuring thrust. Preliminary data was collected, proving the functionality of the system. Future work will bring even greater capability to the test stand, making it more suitable for research and testing that will supplement the Cooper Union mechanical engineering curriculum.

dreadWah

JOSEPH COLONEL AND GABRIEL LOPEZ EE '15
ADVISOR: TIM HOERNING

dreadWah is an automated Wah-Wah guitar effect. An Arduino controls two motors that randomly drag a piece of graphite across a drawing. The contact between the graphite and the drawing creates a resistance that varies the resonance and tone of the effect circuit. This effect circuit alters the input audio, similar to the effects used in Funk music.

VACUUM TUBE PRE-AMP

AVI GADISH EE '15 AND DENNIS GAVRILOV EE '16
ADVISOR: TIM HOERNING

In satisfaction of a ECE314 "Audio Engineering Projects" project utilizing antiquated technologies, a vacuum tube pre-amplifier circuit was designed and prototyped. A vacuum tube is a voltage amplifier, which was slowly phased out after the invention of the transistor. Vacuum tubes distort waveforms differently, and more harmonically, than a transistor, which is the reason vacuum tubes are still sought after by audiophiles around the world. In addition to 'Gain' and 'Level' control, the design of the Tone Stack from the Fender Super Reverb guitar amplifier was modified and implemented in our pre-amp.

CMOS/TTL ALIEN INTRUDERS

MAX MOGEL ME '18, ADVISOR: YASH RISBUD

LATHE

PETER ASCOLI, KEITH CASKEY, ANDREW TALLAKSEN, AND HENRY WANG ME '15, ADVISOR: ESTUARDO RODAS

We custom designed, specced and built a lathe for the student machine shop.

ARM

HARRISON CULLEN, ALYSSA DAVIS, AND JENNIFER TASHMAN BSE '15
ADVISOR: TOBY CUMBERBATCH

Arm is a life-sized endoskeletal structure that mimics the movement of a human arm. Computer-controlled linear and rotary actuators are used to operate Arm, and the automaton is programmed to perform and communicate its human-like features. Freud's theory of the Uncanny was employed in order to contextualize aspects of a biomimetic robot based on the response evoked from a human audience. Arm's main endoskeletal structure is made entirely of brass, and is manufactured in a manner that seeks to manipulate simple motor functions to subsequently produce a more nuanced and believable representation of human motion. All moving parts are exposed in order to provide an easily understandable, and ultimately more inviting, mechanically performative experience.

MEET SPARKY

KRISTIN MILLER AND NICK MITCHELL ME '15
ADVISOR: ROBERT DELL

Sparky is a walking four-legged robot designed to wander Professor Robert Dell's waste-heated gardens. This platform was created to make a diverse set of gardening tasks easier and more convenient. For example, Sparky can have attachments added such as cameras to monitor the gardens or a robotic arm to tend to tasks like planting seeds.

DESIGN AND PROTOTYPING: ARCADE BOXES

ADVISOR: ERIC LIMA

Students for this class worked on creating an arcade box. Each team came up with a creative idea for the game and created a working prototype using their mechanical skills and abilities.

FOOD SCIENCE

ADVISOR: DANIEL LEPEK

This showcase is a collaboration between the students from the applied food science an engineering course and the Culinary Club here at Cooper. The recipes here are all adapted from the winning recipes in the "kitchen arena" final project of the food science class. From left to right, we have a deconstructed pop tart with chocolate and clementine and an earl grey cookie base, the winning fudge recipe (named "uptown fudge"), and a reconstruction of grilled cheese and tomato soup with a cheese soup at the base of the glass topped with a tomato espuma.