



# Program of Exhibits

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## INDIVIDUAL MAKER PROJECTS

**INDIV-1**

### Hollow Cathode Lamp Enclosure with Shutters

*Makers: Greg Hainline, Ethan Fenwick, Frank Tsui*

This is an enclosure to hold hollow cathode lamps used in an atomic absorption spectroscopy system. We need to expand the number of lamps we can use, and switch between lamps in real time. For that reason we had to design an enclosure with shutters. We used CAD to model our design, a 3D printer to prototype shutters, machined parts, anodized our parts in house to create the final system.

**INDIV-2**

### Various Maker Projects

*Maker: Brody Lyon*

I made 3D printed game characters and painted them. I really liked the designs/looks of the models and wanted to give it a try at building them. I used a 3D printer, sandpaper, x-acto blade, paint, and nippers throughout the process. For the keychains I used the laser cutter to cut them out (one is my own design, and the other is from a Japanese gaming company mascot).

**INDIV-3**

### Seeing Sound: An Assemblage of Demonstrations with Acoustic Levitators

*Maker: Keerthi Anand*

What do the Banshee from the X-Men, the Sonic Cannon from the Hulk, and these devices have in common? Sound is being focused to generate a force to counteract other forces, such as gravity. The technology has numerous applications including controlled particle movement, 3D holograms, or useful tools to teach the physics of sound. Build a palm sized levitator using simple circuits, 3D print a device using an open source design, or program larger devices with Arduinos or FPGAs.

**INDIV-4**

### 3D Printed Dual Miniscopes

*Maker: Vincent Curtis*

Miniature microscopes allow us to observe neural activity in mice while they navigate their environment. These dual miniscopes capture activity from 2 remote brain regions so we can determine how two neural circuits exchange information. I have a range of casing prototypes from many design stages that I generated using the Form3 resin 3D printer. By inserting some florescent glass and electronic modules we have a fully functional dual miniscope.

**INDIV-5**

### Puzz-n-Lina: a 3D Story-Puzzle

*Maker: Francesca Talenti, Professor Emerita*

Puzz-n-Lina is a 3D puzzle that is also a graphic novel. I made it out of sheer curiosity, iterating version after version, on and off, over the past five years. It is made on the laser cutter.

INDIV-6

**Lathe-turned Wooden Objects***Maker: Stephan Moll*

I turn wood on a lathe - mostly from local woods that I obtain from fallen and felled trees with my chainsaw - and create bowls, hollow vessels, spheres, chalices, platters, candy containers, jewelry boxes, bottle stoppers, candle holders, etc. I enjoy woodturning as a hobby; I love wood; I enjoy creating; I love seeing and feeling the final product; I enjoy when people like what I created; I enjoy meeting other woodworkers from various walks of life. I use chainsaw, bandsaw, wood lathe and gouges, sandpaper and mineral oil and other finishes, tent and folding tables to participate in local art fairs.

INDIV-7

**1919 House Dress***Maker: Arlene Medder*

I cut and sewed a housedress from a 1917-1925 era pattern because I was going to be working in the Village of Yesteryear at the State Fair; and since I would be wearing a mask, I thought I'd dress like the 1919 pandemic to match. I bought a PDF pattern and first made a blouse version so I could adjust the fit and figure out how it was put together. I used the cutting mats and rotary cutters to cut the pieces from the more expensive fabric, checking measurements. Then constructed the garment, adding a pair of inseam pockets.

INDIV-8

**DIY Metal Cast Jewelry at Home***Maker: Nicholas Day*

I metal-cast a custom designed silver rose ring for my girlfriend. I developed silicon molds, plaster molds, burnout process, and vacuum casting from scratch. You can do it too!

INDIV-9

**Laser-Cut Scrabble Game***Maker: Mustafa Girnary*

My sister really likes this game and I wanted to make her a "fancy" version using the laser cutter. I used primarily the laser cutter for making this along with a few hand tools and a random orbital sander. All of the designing was done in Adobe Illustrator.

INDIV-10

**3-D Printed Model Pool Table***Maker: Andrew Plattel*

I made a model Pool Table because I love the actual game and thought it'd be a good beginner project to design a table top model. I created it via 3-D printing, and I designed it through TinkerCAD. The legs are actually separate pieces with pegs on the ends in order to slide into some slots on the bottom of the table.

INDIV-11

**Laser-Cut Acrylic Accent Lamp***Maker: Maria Palmtag*

This is an acrylic accent lamp, created as customizable gift. When the LEDs in the base are turned on, the acrylic art on top lights up. The lamp was first designed in Fusion360 and then transferred to a 2D vector file for laser-cutting. The removable statement piece made up of two

laser cut acrylic pieces (art by Jordan Rogers) attached together to increase light refraction. The base is made up of layered plywood and acrylic pieces, and it holds an LED strip and its battery pack (from LEDSupply) with a switch accessible from the back.

**INDIV-12**

### **Various Maker Projects**

*Maker: Renzhi Li*

I just build whenever I have free time and inspirations. I build 3d models and design circuit on TinkerCad and then find ways to make them into reality.

## **CLASS PROJECTS: AMST 460H**

**AMST 1-1**

### **Climatopia**

*Makers: Sydney Thomas, Alex Pistiolis, Karla Cordova Araujo, Rachel Willis*

Climatopia is an innovative fabric board game, knapsack resource bag, and 3D printed creative Superhero game pieces to help young people learn how to build more resilient communities. They were developed in collaboration with the University of North Carolina's professional staff at the BeAM Makerspace and a QEP grant for Professor Rachel Willis to be a part of the Makerspace Faculty Learning Community in 2020/2021. The design and production of this water-resistant, sustainable, and mobile climate education tool made of environmentally produced fabric and inks in a resource backpack and 3D printed creative Superhero markers was a collaborative class project started in 2020 and continuing with the Fall 2021 prototype.

## **CLASS PROJECTS: APPL 110**

**APPL 1-1**

### **The Lockbox Jewelry Box**

*Makers: Skyler Harrison Spitz, Savannah Wilson, Julia Bay, Sara Pearson*

We made a jewelry box with a concealed secret compartment to provide an added layer of security to precious valuables. We made it so that there is a peace of mind when someone has expensive jewelry or precious heirlooms. We mainly 3D printed each part of the jewelry box and added vinyl decoration. We used recycled cloth material at Beam for some of the interior.

**APPL 1-2**

### **The Spice Cabinet**

*Makers: Daniel Manila, Alan Van Dang, Lauren Walsh, Taylor Anderson*

We made a spice cabinet with adjustable shelves. We thought it would be useful to have a cabinet with shelves you can adjust to fit or make room for bigger/smaller spices. We use laser-cut wood for the exterior, ridges, shelves, 3d printed hinges, screws, and vinyl-cut designs.

**APPL 1-3**

### **Toy Biplane**

*Makers: Jared Porter, Alex Meredith, Michael Nelson, Andrew Kuttner*

Our product is a wooden, WWI inspired biplane with spinning wheels and propeller. Our product is designed to stand up to rough play from young children who have an interest in planes. We used a laser cut to build the body of the biplane, a 3D printer to print the wheels

and propeller, and a vinyl cutter for the WWI inspired designs. We also used recycled ball bearing from fidget spinners for the wheels and propeller.

**APPL 1-4****Carnival Desk Toy**

*Makers: Andrea Dunn Beltran, Brendan Merritt, Neil Auroi, Eric Casper*

We designed a small table-top organizer for a child in the shape of a carnival ride. The ride will spin through the use of gears and a crank. The organizer is meant for small children to be able to hold crayons, markers, pencils, and other craft supplies. We will have small opening at the top for taller things and a drawer under our base for extra storage. The carnival ride will be life-like with hanging seats (cushioned) and with a colorful design. Tools used included 3D printing, laser cutting/wood, and sewing.

**APPL 1-5****Christmas Crunchtime**

*Makers: Lillian Lamond, Logan Zapp, Paige Summerhill, Brooke Griffin*

We designed a reusable advent calendar for the Christmas time. There are 25 boxes, 1 for each day leading up to Christmas, that can be filled with chocolate or other gifts. Our product is aimed toward parents with young children that want a way to keep the Christmas time enjoyable, but also affordable. We laser cut each box, used the vinyl cutter to make the numbers, and 3-D printed the decorations around the calendar. Finally, the calendar is stacked like a pyramid with a star on top to resemble a Christmas tree. Since this product is aimed towards families with young children we made our product as safe as possible. By covering the product in "fake snow", we were able to soften the hard/sharp edges of the boxes.

**APPL 1-6****Tabletop Shuffleboard**

*Makers: Jackson Wright, Tripp Harris, Akash Ray, Mia Wachter*

We are designing a tabletop shuffleboard game that can be played by up to four people. The board game will have two removable pieces, so gameplay can consist of two, three, or four players depending on the user's desire. The game pieces will be 3D printed disks that will slide along the game board, and the detachable parts of the game will lock into the game board for an optimal playing experience. The board game will be aesthetically pleasing using the vinyl cutter and the pieces will have a pouch that they can be placed in when the game isn't in use.

**APPL 1-7****Flower Table**

*Makers: Leah Howell, Sofia Alba, Gary Zhang, Emily Gafcovich*

The "Flower Table" is a small craft table with a retractable interior compartment. Users can pull out the compact 3D-printed interior and lock it into place, allowing for additional storage room when space is scarce. The product also features a drawer and aesthetic nature-related designs crafted with great care on a laser cutter, and finished with elegant vinyl cutter designs.

**APPL 1-8****Mancala Table**

*Makers: Kyle Smith, Isabelle McGimsey, Kieran Amin, Anna Wong*

The mancala table will be a two-person game with four different types of playing cubes. Our design includes a slide out tray that will store the box that includes the playing pieces. We will incorporate two hand sewn handles for ease of transportation and a combination of originally designed playing pieces and premade ones.

**APPL 1-9**

### **Cool Car!**

*Makers: Enzo Wolf, Joshua Myatt, Kevin Flack, Neha Malkar*

The Cool Car is a small toy car for little kids to play with! The small car will be propelled by a rubber band that will sit at the base of the car and can be easily used. The base of the car will be made of wood and the wheels and other accessories are 3D printed. The car will also have vinyl designs along the side.

**APPL 1-10**

### **Drink Dispenser**

*Makers: Elias Capriles, Taylor Dixon, Ben Rees, Savannah Pless*

Our drink dispenser can be appealing to businesses and families who want a drink machine in their entertainment area. We have designed the machine to have a laser-cut wood base, a 3D printed valve that is designed to prevent leakage, and mechanical lighting to enhance our design. Our project also utilizes a repurposed bottle to fill with liquid.

**APPL 1-11**

### **Porch Swing**

*Makers: Xavier Hilbert, Nick Gargano, Riley Fulmer, Graham Watkins*

Our product is a hanging porch swing targeted towards an older demographic who want to spend time outside. Some of the features are a hinge on the bench to go flat to allow you to lay down as well as railings on the bench for safety. We will be laser cutting the structure and bench out of plywood, 3D printing the hooks, using textiles to make pillows for the bench as well as repurposing chains to support the bench.

**APPL 1-12**

### **Mini UNC Foosball Table**

*Makers: Jerryl Christopher, Isabella Parsons, Kevin Davis, Fangxin Chen*

Our project is a miniature foosball table. We intend to make the box with the legs with the laser cutter as well as finding repurposed objects. We then would use the vinyl stickers to decorate the lines of the field and add more detail and esthetic appeal to the board. The players themselves will be 3D printed, and we will find a repurposed foosball to use. There will also be components of sewing, as we will make a ball collection system. We intend to make it UNC themed, with an acrylic bottom that is UNC basketball court themed. Our intended user is a child from the age of 6 to 12 whose parents want them to be occupied during trips without technology. It will be used as a game for 2 players that is portable and not too heavy.

**APPL 1-13**

### **Decorative Light-Up Christmas Tree**

*Makers: Aaron Williams, Kyra Pudol, Christopher Wooten, Josie Lewis*

We created a wooden decorative Christmas tree. There is a storage space underneath with LED lights that light up on a circuit. The tree has holes to illuminate the lights and decorative 3D printed ornaments and vinyl stickers.

**APPL 1-14**

### **Speedy Smock**

*Makers: Michael Lin, Michelle Buccini, Jenna Merlino, Paige Riordan*

This shirt is ideal for small, creative children who often make a mess while playing or doing art projects. It is designed for easy removal and creative expression, while maintaining functionality. The child will be able to choose which pocket he or she would like to use that day, each one having a unique design. This pocket may be utilized to hold the child's art supplies or toys while they are playing. Once the child is done making a mess, the zippered sleeves will allow an adult to easily and quickly remove the shirt by simply unzipping each sleeve and allowing the shirt to fall. This will avoid the potential difficulties of lifting a dirty shirt over a child's head.

**APPL 1-15**

### **THE Ferris Wheel**

*Makers: Gray McNeish, Yixiao Chen, Christian Campos Ruiz, Melissa Lu*

Our product is a Ferris Wheel storage system. We wanted to design a storage device that uses space efficiently and can also be used as a display decoration. We use Laser Cutter and 3D printing to make product structure with wood and CPE plastic as materials, and use motor to realize the rotation of Ferris Wheel.

**APPL 1-16**

### **The Glowing Globe**

*Makers: Alexander Hart, Yicheng Zou, Audrey Gay*

Our product is a glowing world globe for children. When turned on, the translucent globe allows a blue light, representative of the ocean to shine through serving as a calm nightlight. The base and frame were constructed using laser cut wood, while the globe was made by vacuum forming a 3D printed model. We used the vinyl cutter to create the countries as well as 3D printed planets to surround the base.

**APPL 2-1**

### **Gingerbread Nightlight**

*Makers: Austin Pardue, Jasmine Baker, Martin Altman, Alexander Liu*

Our product is a nightlight for kids that showcases a gingerbread house layout. We made this product to spice up the traditional nightlight with a fun and Christmas themed design. We used laser cutting, vinyl, acrylic, and the 3D printer to construct the product.

**APPL 2-2**

### **Upscale Ant Farm**

*Makers: Jake Smith, Michael Evans, Pavel Sherstyuk, Annabel Grocott*

Ant farms don't have to just be for kids. They can also serve as an interesting piece of decor sure to start many conversations. We laser cut the acrylic pieces, 3D printed the frame and base, vinyl cut the stickers, and used electronics for the light strip.

**APPL 2-3 Automatic Dog Feeder***Makers: Ryan Mchargue, Yifei Li, Kiera Paye, David Osei-Tutu*

We are making an automatic dog feeder. We will compose the food holder out of wood that will be laser cut. We will then use the 3D Printer to make the bowl for the feeder. Then finally we will use the vinyl cutter to design the dog feeder with pictures of dogs and what not for aesthetic appeal.

**APPL 2-4 Pokeropoly***Makers: Will Schott, Samuel Vlahoplus, Jiaxin Zhou*

Pokeropoly is an original game designed for any age group that involves aspects of past board games and new twists. Our game features a laser cut game board, 3d printed player pieces, and game cards along with decorations that were made in the vinyl cutter at BEAM. This game allows all different age groups to compete against eachother through a combination of skill and luck. The goal is to make it all the way around the board but dont be fooled, there are a lot of steps along the way.

**APPL 2-5 Captivating Carousel***Makers: Benjamin Nguyen, Julianna Surkin, Cai Castillo Carvajal, Daniel Kutsch*

The captivating carousel will not only be a great toy for your child, but it also makes a great addition to that cabinet you have with all your decorations. It features a motor that operates using a swicht that causes the carousel to rotate. It also includes precise, laser cut wood and 3D print animals such as the ram. With the combination of these tools in the BEAM makerspace and the vinyl cutter, we hope our product serves as a very decorative and aesthetically pleasing piece of artwork.

**APPL 2-6 Mechanical Owl***Makers: Alejandro Gutierrez-Ochoa, Kate Rodelli, Riley Bergamasco, Brayden Davis*

Our product is a 3D owl with a mechanical aesthetic. We achieved this look by creating the owl out of wood and by using many parts that we designed to look like gears. The individual pieces of the owl were cut out using the laser cutter. The wings have moveable gears all along the sides. Inside of the owl is an electronic light grid made by using electronics and LEDs. The eyes are also made of red LEDs to make them look like laser beams. The owl can be used as a nightlight for children, or for a cool decoration for customers of any age. Finally, we added decals by using the vinyl cutter to add to the mechanical design.

**APPL 2-7 Fate Dice Game***Makers: Adam Weber, Yifeng Peng, Nia Freeman, Elijah Green*

Our product is a dice rolling game that is played with dice, chips, and cards. This was created as a fun game to play 1v1 with friends or family members. It is pretty fast paced and can be paused, but easily returned to. Its main focus is entertainment. We used 3D printing for the hinged dice cup, dice, and chips, laser cutting for the instruction sheet, and vinyl cutting for decoration. We also use a combination of these technologies for the cards and card machine.

**APPL 2-8 Decorative Aquarium***Makers: Kevin Hillesland Jr., Ethan Wolak, Anne Griggs, Jim Appiah*

Our product is a decorative aquarium. It consists of a variety of components created by different technologies. We included 3D printed fish, seaweed, and an octopus, as well as laser cut acrylic aquarium walls and a 3D-printed and electronic-powered water wheel. The aquarium also features an opening and closing lid which allows the user to customize their aquarium however they wish.

**APPL 2-9 Festive Gift Card Holder***Makers: Momo Feng, William Lipman, Brooke Harris, Taylor Knoll*

Our project is a festive gift card holder that puts a spin on an otherwise basic gift. The gift card holder is a box with a 3D printed Christmas tree on top of it. When the drawer on the box containing the gift card is pulled out, the lights on the tree light up and the star on top begins to spin.

**APPL 2-10 LEGO-Inspired Piggy Bank***Makers: Cynthia Fisher, Osemudiamen Izokun, Ruoting Xia, Kyra Pollock*

Our group created a Lego-inspired piggy bank. The piggy bank is in the shape of a Lego man and includes moveable limbs. We 3D printed the body of the man to include a head that can screw on and off to reveal a space for the money. The man has a laser-cut flag as well as vinyl cut features and clothing. This project is built for kids to play with and allow them to keep anything of value safe inside.

**APPL 2-11 Minigolf™***Makers: Sihan Chen, Erich Hess, Max Miceli-Osano, Gregory Murrell*

Our project is a board game version of golf called Minigolf™. The board itself will be a laser cut golf course landscape. 3D printed obstacles will be included in the game but not attached to the board so that users can change the layout of the game every time they play. Miniature clubs and balls will be included. We originally planned to vacuum form over the entire landscape, especially indents, so that the landscape can be painted and water can be poured onto the board to create water features. However, because the vacuum former broke, we will use plastic wrap or acrylic to make our design waterproof. Finally, we plan to add a fourth technology, using electronics to add a working waterfall to our course.

**APPL 2-12 Starry Night Light***Maker: Alexander Gottlieb, Aiyana Woldu, Chloe Zarins, Isabella Parrett*

Our project is a night light for children called the Starry Night Light. The light is space themed and intends to provide comfort to children who don't like sleeping in the dark. The light has a rotating feature and different colored lights to cast beautiful lights like stars around the room. The dome used to house the lighting and rotating feature as well as the base is 3D printed. The night light will have vinyl cut space decorations on the outside, electronics on the inside and laser cut pieces of acrylic to create the different colored lights.

**APPL 2-13****Squid Game – Board Game Experience***Makers: Aijia Zhang, Amarachi Onyekachi, Ricky Estrada, Veda Choudary*

Our Project is a board game inspired by the hit series, Squid Game. The game draws inspiration from the collapsing bridge and provides players an opportunity to compete in a game of skill and luck. Our project features a board designed with a laser cutter and an acrylic trap door system. Other components include 3D printed game pieces and vinyl cut playing cards.

**APPL 2-14****Merry-Go-Round***Makers: Kang Du, Lillie-Anne Suber, Sejal Chakraraj, Ray Shealy II*

Our project is a Mario themed merry-go-round. The top would resemble a mushroom in the game. The middle part consists of 8 characters and karts from Mario Kart. Beyond that, it will automatically spin with the addition of a motor hidden in the bottom piece of the project. The characters are 3D printed. The top and bottom pieces are laser cut.

**APPL 2-15****Wooden Toy Car***Makers: Kevin Chen, Neil Thupili, Mary Cook, Meiyi Lu*

A toy car for children to play with or for toy-car collectors to display. The car's body will be laser cut out of plywood with vinyl stickers to decorate the car and make it ✨aesthetic✨ with vibrant colors and lightning bolt stickers to make it look fast. 3D printed props like seats can be placed into the car to make it look more realistic. Electronics can be used to give our car LED headlights. The axle of the car's wheels can be attached to a rubber band to make it a pull-back toy car that will let it drive forward when pulled back.

**APPL 2-16****Modular Phone Case***Makers: Ethan Clark, Kush Shah, Isha Atre, Jacob Terry-Edmunds*

Our product is an iPhone 12 case that comes with several interchangeable attachments. Our attachments include a pop socket, phone card holder, and phone stand. The intended users of our product are teenagers and young adults who enjoy using phone attachments. We created our product using 3D printers, laser cutting, and vinyl cutting.

**APPL 2-17****HotShot - Tabletop Basketball Themed Game***Makers: Joseph Frierson IV, Sam Schulte, Christopher Hewgley*

Our project, the Hotshot, is a tabletop basketball-themed game to be played by two players. Each player uses a launcher to shoot a ball into the center hoop, where the first player to score 7 points wins. The game's design resembles a basketball court enclosed by a cage, so the ball stays within the field of play. The launching mechanism will be achieved through the use of a 3d printed hand torqued piece at each collecting point.

**APPL 2-18****Advent Calendar with Tree***Makers: Alyssa Walawender, Frank Edwards, Elad Ohana*

Our product is an advent calendar that will use dixie cups as compartments and will have a tree on top to decorate each day. The doors will have hinges and each compartment will have a

unique figure that will go on the tree. The project will use laser cutting, 3d printing and vinyl cutting.

**APPL 3-1****Ice Breaker Travel Buddy**

*Makers: Nicole Vanderwoude, Benjamin Woodman, Kevin Dai, Winnie Yeung*

We are creating a travel case that doubles as a board game that allows individuals to ask ice breaker questions as they play the game. the travel case will have space to store a few travel essentials for children and double as a fun form of entertainment.

**APPL 3-2****Amphibian Cage**

*Makers: Justilyn Lavapie, James Brown, April Kim, Jacob Litvack*

We are creating a cozy shelter for our pet lizard, Fred. The cage will contain different designs to fit the needs of Fred and his owner. These designs include, clear acrylic walls for visibility, hinged door, food bowl, storage compartments, and wheels.

**APPL 3-3****Back-Desk**

*Makers: Nicholas Mountain, Olivia Holden, Allyson Mattson, Noah Weaver*

Our project is a portable desk that can be worn by one person so that the desk is set up on their back. This way, someone can walk behind them and do work on their computer. We decided to make this because we wanted to create something that was unique and could not be found anywhere else. We are making it by using a laser cutter to make the desk part, a 3d printer to create hinges for the desk, and a vinyl cutter to create a fun design on the product.

**APPL 3-4****Fitness Tracker Watch**

*Makers: Trinh Kieu, Mohammed Alnasser, Chengze Xie, Ari Kauftheil*

The fitness tracker watch tracks our user's steps, flights of stairs, and room temperature. This data helps the user track their fitness/exercise progress. It will be made using a 3D printed case, a laser cut door, an arduino and a couple of electronics sensors for the fitness data. Vinyl cut stickers will be used to paint designs on the outside of the case.

**APPL 3-5****Extendo Wind Turbine**

*Makers: Eric Oyugi, Mukesh Loganathan, Christopher Sousounis, Elijah Bassett*

Our group has decided to create a mountable wind turbine. By mountable, we mean that the turbine will be designed to be fixed to any surface – whether it be a concrete slab, a slanted roof, or a pond – with minimal effort. We intend to extend the benefits of wind power to all of those who cannot currently afford it, especially landowners and rural homeowners in the United States ‘wind belt.’

**APPL 3-6****3D Task Boxes**

*Makers: Allie Grey, Ronan Stack, William Fleischer, Mohana Murarisetty*

A 3D to-do list that is modular and interchangeable, primarily constructed of laser-cut acrylic, with 3D printed figurines and potentially other small components, as well as an electronic

button and light, the latter of which will be controlled by the former. 3D Printed charms/figurines can go on top of each box to represent a task. Intended for people who struggle with everyday tasks and/or mental health that are seeking motivation or reminders to do those tasks.

**APPL 3-7**

### **Desktop Reaction Board**

*Makers: De'rishio Reid, Ziheng Guo, Michael Marengo, Owen Jenssen*

A reaction board similar to a game of whack-a-mole. LED lights randomly light up and you need to hit a button next to it to turn the LED off. The board will record and display the user's reaction time. We made it for anybody who wants to work on their reaction times, including athletes, gamers, etc. The body of the board is lasercut wood; the buttons, hinge, and wheels are 3D printed; and arduinos, buttons, display boards for electronics.

**APPL 3-8**

### **Porta-Pup**

*Makers: Fiona Chen, Isaiah Standridge, Ethan Ebbighausen, Jiahuan He*

We made a dog-food dispenser for traveling pet owners with attached pockets and a water bottle holder. We cut the main section of plywood using the laser cutter, 3D-printed the dispenser piece and water bottle clip, vacuum formed an integrated dog bowl, and stitched together straps to mount it in a car or to carry it with.

**APPL 3-9**

### **Spinning Roulette Selector**

*Makers: Samuel Westall, Garrison Parrish, William Anagnos, Michael Jiang*

A tool that uses a 3D printed wheel and a wooden game to randomly select anything of your choosing. Our original will be set up to randomly select restaurant options to create a fun way to pick a place to grab dinner.

**APPL 3-10**

### **Rotational Closet**

*Makers: Aknazar Janibek, Li Fu, Jeff Zhuo*

Our team is creating a rotational closet consisting of multiple levels. We made this to help people with picking out different combination of outfits and integrate with a car so you can change on the go. We will be using the laser cutter, 3D printer, and sewing machine to achieve this task.

**APPL 3-11**

### **The Flip-A-Day**

*Makers: Eileen Foster, Michelle Nguyen, Brooke Chow*

The Flip-A-Day is a wooden calendar which allows users to manually change the months and dates on a 3D-printed loop. This is for students, teachers and office workers want a sustainable and aesthetic calendar that can be used for many years.

**APPL 3-12**

### **Cycle to Light**

*Maker: Fangchen Chen*

A gear mechanism to generate electricity from rotational motion. Green energy, healthy lifestyle, and human-centered technology are all marketable labels. Laser cut the frame, 3-D printed the gears, and use electronics to generate electricity to light the LED.

#### APPL 3-13 **Flippy Shapes**

*Makers: Justin Wang, Dev Patel*

Our group is creating a game where you will have different game pieces which will be different 3-D shapes. The goal of the game is to flip the shapes and to land them just like the "bottle flip challenge." There will be varying difficulties of shapes for you to land as well as bonus challenges that will award you points such as platforms that make landing the shapes more difficult.

#### APPL 3-14 **Desktop Destressing Station**

*Maker: Sarah Ferguson*

My project is a laser cut Ferris wheel with 3D printed interchangeable storage containers. The user can choose to use those with compartments and that are labeled for use as a fun and unique medicine organizer, or choose from the other 2 sizes of single compartment containers for storing jewelry or anything of their choosing. It also has an accompanying Zen garden for added relaxation that is composed of many 3D printed tools, accessories and toys as well as vacuum formed molds for building in the sand.

### CLASS PROJECTS: APPL 285

#### APPL 4-1 **Ancient Automata with Fluid Mechanics**

*Maker: Merve Rida Bayraktar*

My project is recreating an ancient water basin from "The Book of Knowledge of Ingenious Mechanical Devices" by Al-Jazari (written in 1206 CE). The original design was used for performing ablution. The recreation is a smaller model, demonstrating the fluid mechanic principles of siphoning. I also chose this design because it shows the diversity of cultures, identities and nations among the scientists, challenging the idea that civilization and science was created by the West. I used tubing, laser cutting, drilling, paint and vinyl to create this project.

#### APPL 4-2 **Laser Cut Tesla Valve**

*Maker: Max Micelli*

A tesla valve is a device that only allows flow in one direction, that has no moving parts. I wanted to demonstrate the phenomenon by building something physical. I made it by laser cutting acrylic sheets and then gluing the layers together.

## CLASS PROJECTS: ECON 125

### ECON 1-1 **Laser Cut Wooden Locker**

*Makers: Kishan Patel, Emma Handy, Justin Farmer, Spencer Hood, Alice Holding*

We made a locker that was built to fit under kenan stadium seating. This is a prototype for our Econ 125 venture idea. We made it by laser cutting wood into the correct dimensions, gluing them together, and installing insulation inside the box to keep food and drink at optimal temperatures inside.

### ECON 1-2 **WristWellness – Smartwatch for Mental Health**

*Makers: Tianle Yang, Jacob Crawford, Omarion Bitting, Addison Lewis, Javon McCain-Murphy*

It is a smartwatch that can send notifications like "meditate for 5 mins?" to increase the user's mental health. We use cardboard and paper with our drawings on it to imitate the page of the smartwatch.

## CLASS PROJECTS: PHYS 100

### PHYS 1-1 **Clock Escapements**

*Makers: Students of PHYS 100*

An escapement is any mechanism that facilitates the transfer (conversion) of energy to a device that displays repetitive action. As a general rule, an escapement also acts as a regulator of the repetitive action. For a clock, the escapement's traditional role is to transfer the potential energy of a falling weight or coiled spring to a pendulum, which acts as the time-keeping device.

## CLASS PROJECTS: SPAN 329

### SPAN 1-1 **Tierra del Caramelo**

*Makers: Ryan Morris, Sierra Moriuchi*

Board game based on the indigenous Guaraní. We made it for Spanish 329, and used the foam cutter.

### SPAN 1-2 **3D-Printed & Laser-Cut Matching Game for Spanish**

*Makers: Kaylyn Gordon, Lindley Gorman*

We made this game as part of a Spanish project. The premise of the game is to match English with Spanish, and then Spanish and Quechua, to teach the overall importance of diversity in indigenous languages. This game is for middle school aged students can play and learn!

### SPAN 1-3 **Lo Empareja!**

*Makers: Simran Singh, Alexa Tselides*

Matching game involving aspects of afro latino culture such as clothes, food, and notable descendants. We made this game to spread cultural awareness and introduce the culture to kids at a young age, as many people are descendants of this culture and do not acknowledge it due to lack of understanding of it. We created the project at BeAM using paint and cardboard pieces to create our box.

#### **SPAN 1-4 Afro-Latino Inspired Instruments**

*Makers: Emmie Kendrick, George Kostantinis*

We made instruments dedicated to Isla nonprofit school for kids to learn about afro-Latina culture. We created sentences in Spanish and corresponding books.

#### **SPAN 1-5 Lotería Sobre la Cultura Afrolatina**

*Makers: Mayerlin Alpizar, Rosa Aguilar Perez*

A game similar to bingo where each player answers a question after each card is called out. The game focuses on informing the players about the Afrolatino culture.

#### **SPAN 1-6 Uno: La edición afrolatinx / Uno: Afrolatinx Edition**

*Makers: Logan Cecil, Ryan Clements*

We designed Uno: Afrolatinx Edition to teach audiences, both younger and older, about the presence of the afrolatin@ community in pop culture, athletics, and history. We made this game by modifying an existing Uno deck using lamination, printing, scissors, and technology (for research).

#### **SPAN 1-8 Interactive Game About Los Taínos**

*Makers: Sierra Sanders, Aniyah Russell*

This is an interactive, conceptual game about Los Taínos de Puerto Rico for span-329. This game refurbishes an operation game, but we laser-cut our own pieces that corresponds with the words/cards of words that los Taínos created years ago that we still use today in the Spanish language.

#### **SPAN 1-9 Garifunopoly**

*Makers: Sara Dreyer, Jasmine Dennis*

We made a 'remake' of Monopoly with the theme of the Garífuna indigenous culture. We have students read cultural information about the Garífuna people before beginning the game and in order to buy a space the students must answer questions about the culture. We used MakerSpaces in the process of designing and planning our game including markers, construction paper, and rulers. We also laminated many elements of the game.

## **CAMPUS PARTNER ORGANIZATIONS**

#### **PART 1-1 Kenan Science Library Research Hub**

The Kenan Science Library Research Hub supports innovation, entrepreneurship, and making as part of UNC Libraries' [Research Hub](#). The [Makerspace@Kenan Science Library](#) is equipped with 3D printing, 3D imaging, electronics and soldering, and sewing machines and also features a design and modeling center and a virtual reality design studio.

**PART 1-2****The Shuford Program for Entrepreneurship**

The Shuford Program in Entrepreneurship was created in 2004 to encourage arts and sciences students from diverse backgrounds and with different interests to learn to view the world through an entrepreneurial lens. Our program is a perfect complement for all majors because we provide practical business knowledge that can be applied to any industry.