



# Program of Exhibits

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## INDIVIDUAL MAKER PROJECTS

**INDIV-1****Sticker Bike!!***Maker: Alex Bean*

I used the makerspace to perform maintenance on my bike! I also created and affixed a large sign and a few features that my bike didn't previously have, like a holder for my phone.

**INDIV-2****Handmade Baroque Guitar***Makers: James Crescenzi, John Pringle*

I made a baroque guitar modeled after the 1679 Stradivarius guitar. It was built so that I could play period specific music on the instrument it was written for and so that I could play in early music ensembles here at UNC. It was primarily made using traditional woodworking hand tools such as a hand plane, chisels, a card scraper, etc. with the addition of a bandsaw, a drill press, sandpaper, and super glue.

**INDIV-3****Portable Modular Tool Cart and Workstation***Maker: Canain Stanley*

I do wood sculpture and home remodeling, so I am often transporting tools back and forth from on-site locations. I designed this tool cart to be a rugged, portable, organized container that doubles as a work surface. The outlet and worklight are powered through a length of cable that is stored in the lower plywood box when traveling, and pulled out when needed. I used mostly scrap material and hardware for the construction, sourced from discarded furniture and demolition waste.

**INDIV-4****Bowery Pet Supplies***Maker: Heiker Medina*

Bowery Pet Supplies is an online pet brand that focuses on sustainability, quality, and durability. We build plant-based pet supplies like dog collars that are continuously customizable with different bow ties and accessories. Bowery is aiming to provide quality products that are durable and last longer than conventional products with lower life-spans. I used two grants which I raised from this past summer and hired a seamstress. I worked with suppliers and customers to drive a dog owner study of >400 people to identify which needs were most important.

**INDIV-5****May the Acoustic Radiation Force Be With You***Maker: Keerthi Anand*

Either as an instructive tool to inspire middle-high school students into STEM careers or a scientific instrument to control particles, or fluids in micro-gravity, acoustic levitation is a fascinating phenomenon to experience first hand. Try to levitate a particle through an obstacle course, see cool aerial dances with sound, feel the force of ultrasound! With a little soldering and programming an Arduino microcontroller, you too can make one!

**INDIV-6****FIRST Robotics Competition Robot**

*Makers: Zuntue Pommerich, Nivas Kollu, Matthew Mitchell, Tyler Arnold, Sydney Lin, Cole Malinchock, Ryan Attack, Avi Hoop*

This is a robot made to compete in this year's FRC challenge Rapid React sponsored by the Boeing Company. It was made through lots of hours in the lab.... (Over ten thousand combined hours over 4 months). New things this year included a CNC machine and advanced programming like trajectory following and odometry.

**CLASS PROJECTS: AMST 398****AMST 1-1****CLIMATOPIA: Building Resilient Communities**

*Makers: Professor Rachel Willis, Sydney Thomas (UNC 2021), Alex Pistolis (UNC 2021), Fall 2021/Spring 2022 AMST students*

CLIMATOPIA is an innovative fabric game and resource backpack for people aged 9-99 developed with BeAM and APPLES support to share strategies and resources to help plan for, face, and recover from climate change enhanced water disasters. These disasters include extreme heat, severe precipitation events, hurricanes, droughts and wildfires. Students have iteratively designed game rules and strategies, illustration, and pieces. Using BeAM training and facilities they have collaboratively designed and made all the game pieces, board, and curated resource links to produce the fourth iteration of the game for distribution to non-profit environmental centers in North Carolina.

**AMST 1-2****CLIMATOPIA 3D Printed & Laser-Cut Game Pieces**

*Makers: Cher Xiong, Edward Estrada*

Using Tinkercad and Ultimaker and starting from Fall 2021 prototypes, they worked on improving the design of game pieces, improving production efficiency, and finishing of parts. They then produced a more environmentally friendly wooden set of pieces on the laser cutter for playing the game.

**AMST 1-3****CLIMATOPIA Vinyl-Cut Game Card Illustrations**

*Makers: Jordan Jordan, Betseat Tadiwos*

Using Adobe Illustrator and the Vinyl Cutter created cards for players, resources, information, and events. Created both vinyl sticker versions for games that are distributed to non-profit education centers as well as files for printed cards for individual use.

**AMST 1-4****CLIMATOPIA Fabric Design and Laser Cutter Prototyping**

*Makers: Jeff Manion*

Coordination of all design elements using Adobe Illustrator and using the design iteration process to develop prototype parts of word and cards. Assisting in ordering custom fabric designs for printing by Spoonflower. This source enables individuals to order one yard of the fabric, sew the game and resource bags, print cards from the website, and use recycled items for markers to create their own Climatopia game.

**AMST 1-5****CLIMATOPIA Sewing Game Board and Bags***Makers: Mikayah Oxendine, Cole Schmidt, Caroline Shields, Juliana Koricke*

Learned to sew with prototypes material designs and then developed modifications to improve the functionality and efficiency of production. Included a double-sided fabric board game with links and a website GRC code on the reverse to get more recovery resources. The backpack has the logo, details, and credits on the front side. The back side contains the game rules. Finally, the small bag was designed to hold all game cards and parts and provide a safe way to transport the game as well as a website for learning more about climate change impacts on vulnerable communities.

**CLASS PROJECTS: APPL 110****APPL 1-1****The Knocking Alarm***Makers: Russell Warren, Thi Le, Can Kilic, Alex Johnson*

We made an elaborate alarm that has a hand that knocks when the time goes off. We made this because most alarms do a poor job at actually getting sleepy people out of bed. We used electronics, the laser cutter, the vinyl cutter, and the 3D printer.

**APPL 1-2****Desktop Organizer***Makers: Antonio Tudela, Aditya Uchil, Michael Rogers*

We made a laser cut desktop organizer with repurposed and 3d printed handles that implements an extension cord for powering users' devices. We made it to allow users to organize their desktop. We made it with laser cut birch plywood, 3d printing, and connected it with wood glue and hardware.

**APPL 1-3****Medication Organizer for People with ADHD***Makers: Ashley Aragon, Hannah Cruz, Maura O'Sullivan, Robbie Wilson*

The product is a gamified medication organizer that looks like a typical weeklong medication container. Each day's compartment would contain a game piece that connected to a larger puzzle across the week. By linking habit and reward, the game pieces would help combat the dysfunction and memory issues that sometimes prevent those with ADHD from taking their meds consistently. At the end of each week, the pieces and next week's meds would return to their compartments. We mainly used the 3D printer, laser cutter, and vinyl cutter to create the components.

**APPL 1-4****Class Plant***Makers: Ethan Malin, Andrew Lewis, Natalie Rodriguez, Anika Jibben*

We made a portable planter box for a teacher of young students. We made this using the laser cutter, wood-shop tools, vinyl cutter, and 3D printer.

**APPL 1-5****Floating Flower***Makers: Jon Einsmann, Summer Sledzieski, Rochelle Muñoz, Sarah Gallagher*

Hanging windchimes with floral and naturalistic design custom created for a couple that loves gardening and the outdoors. These windchimes are made of recycled materials and are customizable, therefore they will fit in great in the couple's garden. We made these windchimes with the laser cutter, 3D printer, vinyl cutter, and recycled parts.

**APPL 1-6****Pile of Rubbish***Makers: Logan Timm, Melanie Cooke, Zuntue Pommerich, Ryan Zheng*

This is a fun desktop trash can design! We used a laser-cut base, 3D printed lid (that opens and closes!), vinyl cut logo, and sewn reusable liners.

**APPL 1-7****Nebula Nursery***Makers: Brooke Scullin-Baccarella, Addison Skigen, David Lundberg, Claire Friesen*

We designed a mobile to be hung above an infant's crib. Our target user is new parents who want something that stimulates their child when they're not in the room that is safe and engaging. We used the 3D printer, laser cutter, embroidery machine, and pre-existing materials.

**APPL 1-8****LED Clock Guitar***Makers: Ren Millis, Can Tunceli, Jimmy Toole, Cameron Grant*

Our project is a body of a guitar, created with old clock parts to form a functional clock face within the guitar and lined with colorful LED lights! This was designed for a guitar player who wants to wow his or her audience. It was made using 3D Printing, laser cutting, and Arduino electronic circuits.

**APPL 1-9****Deskballer***Makers: Alyssa Acunto, James Pierce, Ethan Schroeder, Caden McCray*

Deskball is a basketball game for your desk. Load the launcher, aim, and score! A game for adults to keep the child in you entertained at work. Built with laser cut acrylic and plywood, vinyl cut designs, and 3D printed catapult and basketballs.

**APPL 1-10****Pandora's Box***Makers: Sonam Shah, Justin Thompson, Crista Izuzquiza, Stephany Kim*

We made a jewelry box to organize different kinds of jewelry such as earrings, bracelets, rings, necklaces, etc. We made it to help our target user organize her jewelry into different boxes and sections so that she can see each pair of earrings she owns as well as other different accessories. We made this project using the laser cutter, 3D printer, and the vinyl cutter.

**APPL 1-11****Koi 4 Kids***Makers: William Bucher, Kayla Dutcher, Camilo Corrales, Dhruvi Patel*

Our product creates a fun experience for young children to enjoy! It includes a memory card game packaged in an articulated koi fish powered by servo motors with LED lights and speakers. This immerses your young child into a aquatic experience while promoting learning!

**APPL 1-12**

### **Mini Bar Cart**

*Makers: Ryan Barrett, Vedika Birla, Kathryn Carrick, and Pooja Patel*

Our product is a mini bar cart. It is intended to be a useful and visually appealing storage device to be displayed on the counter in the kitchen of young/fashionable individuals. We made it with 3D printed parts, laser-cut plywood, and vinyl stickers. We used a recycled shoebox and integrated an Apple Magsafe Charger along with a wine opener.

**APPL 1-13**

### **The Singular Shot Ski for Students Who Hit the Slopes**

*Makers: Sadhana Ramesh, Manas Tiwari, Marisa McGovern, Alexandra (Allie) Carmack*

The “Solo ShotSki” is a shot ski for personal use. The intended user is a college student who is of legal drinking age watching the UNC vs DUKE game while they are in isolation for COVID-19. The user has a need to have a fun time celebrating at Tar Heel win, ingest shot sized amounts of liquid (whether that be cough syrup to help with their COVID-19 cough or if the user is of legal drinking age, taking shots to celebrate while on facetime with their friends). We used a laser cutter for the miniature body of the ski, the vinyl cutter to decorate it, and the 3D printer to create a detachable component that can hold a standard-size shot glass.

**APPL 1-14**

### **Laser-Cut Coin Piggy Bank**

*Makers: James Clayton, Madeline Conway, Nestor Tellez*

Our project is a laser-cut coin piggy bank with LED and 3D printed components. You drop the coin in from the top and can see it drop down to be organized.

**APPL 1-15**

### **Laser-Cut Board Game**

*Makers: Owen Althouse, Noah Frahm, Yunshu Yu, Xingda Li*

This project is a reusable cloth bag made from sustainable materials. We made this bag to show how simple recycled materials are able to build functioning products. We used the 3D printer to make the buttons, laser cutter for the cardboard inlays, and the sewing machine for assembly of the components.

**APPL 1-16**

### **Dino Disaster Sim**

*Makers: Daisy Huang, Miranda Black, Jaden Parker, Logan Siege*

We made a diorama which incorporated an escapement plan. We wanted to create something artistic with the accent piece being the escapement. We used the laser cutter to create the outer box, the 3D printer to create the dinosaurs and escapement pieces, and we used the vinyl cutter to make stickers to set the scene.

**APPL 1-17**

### **Sensory Cube Toy**

*Makers: Rithika Jonnalagadda, Madelein Ngo, Andres Cardenas, Byron Medina-Nunez*

Our project is a sensory cube for neurodivergent kids to play with in public spaces (e.g. hospital waiting rooms, playgrounds, parks, etc). The cube has multiple mechanisms, including switches, buttons, gears, and other tactile stimulants. We made this cube using a laser cutter, 3D printer, textiles, and electronics.

#### **APPL 1-18 Tarheel Trunk**

*Makers: Alleigh Wiggs, Madison Moore, Mason Wittman, William Hart*

Our prototype is a chest that could be used for storing items as a UNC student. There are multiple sizes available. From the small one for jewelry all the way to the large one made for a student. Laser cutter, 3D printer, and vinyl cutter were used.

#### **APPL 1-19 3D-Printed and Laser-Cut Ship with Vinyl Lettering**

*Makers: Katie Long, Matthew Pollard, Jacob Goldstein, Vishal Shah*

We made a ship for our class project that had to combine 3 different materials in the Makerspace. The hull and propeller are 3D printed, the deck was laser cut, and the stickers used to name the boat used the vinyl cutter.

#### **APPL 1-20 Checkerboard Picnic Basket**

*Makers: Thayer Hicks, Maxfield Palmer, Andrew Lewis*

We made a picnic basket with an included checkerboard for those who want to add a little fun to their picnics. We created this design from scratch in Adobe Illustrator and Fusion360. Materials were produced using a 3D printer, laser cutter, and vinyl cutter.

#### **APPL 1-21 Desk in a Can**

*Makers: Michael Pearce-Ros, Shresht Kolavennu, Nishad Kosaraju*

The Desk in a Can is designed to be an easily portable storage designed for integration into cupholders. It was made using 3D printing, laser cutting, and vinyl cutting.

#### **APPL 1-22 LAPTOPIA**

*Makers: Sarika Kasuganti, John Kirolos, Caroline Perez, Aadit Mehta*

In this technological age, the shift from board games to video games has never been more apparent. We have attempted to bridge this gap by creating LAPTOPIA, the world's first laptop-themed board game. We used a laser-cut, plywood base to develop the board, added 3d-printed legs to make the structure double as a laptop stand, and topped it off with vinyl-cut designs. We cannot wait to play the game with you!

#### **APPL 1-23 Portable Pinball Machine**

*Makers: Lucy Ren, Mayra Fabian-Gonzalez, Mia Baird*

We made a portable pinball machine. We made it because we wanted a game that was portable as well as something that didn't need anything electronic. We used the laser cutter to cut the wood base as well as all the obstacles. After that we used the 3D printer to print the levers and the ball. Lastly we used the vinyl cutter for instructions and decoration.

**APPL 1-24 Accessible Gaming Controller***Makers: Oliver Kimsey, Abigail Hinson, Soumya Mahavadi, Luis Rivera Gonzalez*

The Accessible Gaming Controller (AGC) is a one handed gaming controller that makes gaming accessible to people who are incapable of playing with a “regular” two handed controller. The purpose is to make this controller feel so natural that it can become everyone’s “regular” controller. This project mainly requires 3D printing and electronics/programming, but the laser cutter will also be used for certain wooden parts.

**APPL 1-25 Spinning Storage Wheel***Makers: Caroline Jones, D'anta Carter, Enpei Zhang, Sean Billy*

We made a spinning wheel with hanging baskets that can be mounted on a wall and spun to be used as a rotating storage system. The purpose of the wheel is to save on storage space by easily cycling out baskets when they are or are not needed. It was made using 3D printing for baskets, gears, and a labeling system, laser cutter to create the wheel itself, and the vinyl cutter to create stickers for labels.

**APPL 1-26 Laser-Cut Phone Stand with Acrylic Lens Filters***Makers: Marky Noronha, Taliya Lewis, Hannah Koceja*

The project primarily includes a wooden/acrylic phone stand and lens filters cut through a laser cutter. There is also a 3D printed stand for the filters. The inserted filters can alter the look of a photo taken when a phone is placed in front of it. The filters can even be used for other electronics such as a DSLR camera or projector.

**APPL 1-27 Remote Controlled Car***Makers: Yuvraj Jain, Elias Arroyo, Aarav Mehta, Kelly Yun*

For our project, we built a small remote-controlled car that has an opening for a phone case. The project was meant to create videos for people ranging from home videos to movie production that would capture high speed at a low vantage point. We use Arduino electronics to build the electronics within the car, a laser cutter to make the wood frame, a 3d printer for the inner holdings within the chassis and a vinyl cutter for the decals on the outside.

**APPL 1-28 Jujutsu Kaisen Inspired Jacket, Ring, and Earrings***Makers: Ella Carter, Connor Barnes, Michelle Zheng, Felicia Li*

We made a jacket embroidered with scenes from the anime Jujutsu Kaisen. We made laser cut earrings featuring scenes from the show, and a 3D printed ring featuring a snake decal from the show.

**APPL 1-29 The Design Fun House***Makers: Winnie Ren, Amy Song, Jesus Cabrera, Ryan Schroeher*



It is comparable to a typical dollhouse, however, it has moving components like an elevator as well as additional features and components that can be added that allow a child to practice their design and organization skills in whatever way they desire. The open frame of the house allows for children to make their own furniture setups, explore decorations, and practice interior design. We used laser cutter, 3D printer and vinyl cutter to make this product possible.

**APPL 1-30 LazyLaundry**

*Makers: Sterling Adams, Shreya Gundam, John Stoehr, Farouk Charkas*

LazyLaundry is the only smart laundry basket you will ever need. Plywood, CPE filament, servo horns, and servos were used to make the process of pre-sorting laundry between lighter colors and darker colors automatic. Laser cutting, vinyl cutting, Arduino programming, and 3D printing were used.

**APPL 1-31 Cloud Lamp**

*Makers: Zirui Liu, Herui Song, Aliza Sutich, Satvik Chethan*

It's a lamp for decorative and functional purposes. We used 3d printing, laser cutter, and bought electronics.

**APPL 1-33 Go Wild! Go Kartz!**

*Makers: Ellie Robert, Amber Huang, Janice Cheuk, and Chloe Allen*

This is a racing game that reuses rubber bands. Although it's intended for children, it can be used by anyone. It was created with laser-cut plywood, 3-D prints, and vinyl stickers.

## CLASS PROJECTS: APPL 240

**APPL 2-1 Mini Drumset**

*Makers: Andrea Dunn Beltran, Kyra Nicole Pudol*

This project is a mini drum set that can be played for entertainment. It is composed of 4 drums each with an FSR sensor under each face. The drum should change volume depending on how hard the face is hit. The FSR changes the output voltage based on the force applied which is then read through the LabJack then processed by a LabView Program.

**APPL 2-2 Whack-a-Hat**

*Makers: Anjali Mehta, Benjamin Silver, Michael Lin*

We made our own version of whack a mole for a project for our class. We used 3D printing and electronics to make this project.

**APPL 2-3 Digital Keyboard**

*Makers: Kayla Dutcher, Renzhi Li*

It is a digital keyboard with a few extra settings for extra fun. Made as a way to experiment with circuits and sensors as an interactive experience. We made it with buttons, capacitors, resistors, wires, sensors and a LabJack.

## CLASS PROJECTS: APPL 412

APPL 3-1

### The ClipNZip

*Makers: Robert Gan, Martin Altman, Sarah Ferguson, Leah Howell*

The ClipNZip is a tool designed to make it easier for people with dexterity issues to zip up their jackets. The ClipNZip allows for one-handed use and is portable, durable, and universal. Our product will help users like Leah's twin sister, who has cerebral palsy, zip up their jackets and gain more independence.

APPL 3-2

### Retraxt is an Easy Way to Store Your Cables

*Makers: Mukesh Loganathan, Alex Gottlieb, Samuel Schulte, Fangchen Chen*

We have developed an all-in-one solution for people who have many cables and are trying to reduce the amount that they need to buy. Furthermore, we aim to reduce the environmental impact unused cables have when they are put into landfills.

APPL 3-3

### Bug Off

*Makers: Austin Pardue, Hanson Church, Kefei Tong, Avery Twyman*

This is a product to help people get insects out of their homes in a safe way. The purpose is to allow people from getting close to insects if they are afraid of them. The product is made out of acrylic and 3D printed materials.

APPL 3-4

### Pasta Drainer 2.0

*Makers: Brooke Griffin, Emily Gafcovich, Cristian Leyva-Hernandez, Jerryl Christopher*

Cooking with water and pots can be difficult due to the weight, heat, and motion required to empty water. More specifically, people with limited strength and dexterity may have difficulty dumping the contents of a pot into a sink. For this reason, our project allows people to more safely empty heated pasta water from a pot and prevent injury. This project was built using the laser cutter and 3D printers with materials such as acrylic, PETG and 3D filament.

APPL 3-5

### The Aerodynamic Umbrella

*Makers: Harrison Spivak, Kevin Davis, Mohana Murarisetty*

Our project is an umbrella that will address the issue of multidirectional wind resistance. We have developed flexible joints that allow our umbrella to resist the winds from multiple directions. Currently, the common problem for umbrellas is the lack of wind resistance from a unidirectional and multidirectional standpoint. We have placed multiple joints 2/3rds of the way through the dome of the inside shell of the umbrella to allow the circular dome shape to flex upwards in the wind and avoid the issue of imploding the dome structure. Our project aims

to create an improved view of umbrellas and a safer and drier environment for those in the rain & wind. The processes involved 3D printing for proof of concept in the form of a low fidelity prototype to verify and metal working in BEAM to modify an umbrella frame.

## CLASS PROJECTS: APPL 496

### APPL 4-1 LED E-Textiles

*Maker: Charlotte Dorn*

My project consists of two separate parts. The first is a black top with a heartbeat sensor worn underneath, which is visualized through pulses on the LED heart on the front. The second includes two harnesses, worn by separate individuals, each with their own color. The devices communicate using wifi signals and the colors will merge together when the users get closer to each other. Although there are vast implications of wearable technology in the future, my project is more directly a form of "infotainment," with the goal of demonstrating the intersection of technology and design and exposing new audiences to the possibilities of integrated electronics. This was made using tools in the BeAM makerspaces, including soldering irons, sewing machines, the Serger, and basic hand tools.

## CLASS PROJECTS: APPL 590

### APPL 5-1 Ancient Greek Learning Games

*Maker: Cecilia Poston*

These two games, a verb conjugation board game and a noun matching game inspired by the hit game Spot It, are meant to address the gap between modern language instruction and the methods in which Classical languages (like Ancient Greek and Latin) are still taught. The board game was designed in Adobe Illustrator, cut on the laser cutter, and finished in the woodshop. The 'Spot It' inspired game cards were created using a computer algorithm which then aided its design in Adobe Illustrator, before the cards were printed out and assembled.

## CLASS PROJECTS: ASIA/PWAD 069

### ASIA 1-1 Bust of Frankenstein

*Makers: Andrew Mooring, Spencer Sabatino*

We made a bust of Frankenstein for the purpose of portraying the conflicts in the Middle East discussed in class and the idea that no one wins when war takes place. We made it by painting a styrofoam ball and decorating it with wires, newspaper, etc. to further exhibit a few themes.

### ASIA 1-2 Two Sides to a War

*Makers: Joseph Macia, Simon Tang, Jack Murphy*

We decided to make a chess board with two "dictators" playing the game using their troops as the pieces. In the middle of a board is a number: either a 6 or a 9 depending on what side you

are looking from, showing how there are always two sides to a war. We used 3D printing for the camera, a box for the board, army figures for the people and painted the top of the board.

**ASIA 1-3**

### **The Media's Checkerboard**

*Makers: Antonio Preziuso, Steven Yu, Luck McCabe*

Our artwork is a board this is divided with a scene of war and a side that represents the media. This work depicts the issue of journalism in war, illustrating how war is often shown as "black and white" instead of truly complex. Our project is a representation of a theme we discussed in our first-year seminar. We utilized mostly recycled materials including wood, cardboard, newspaper, scrap metal, and old electronics. This was assembled by painting, cutting, and bending metals.

**ASIA 1-4**

### **Papier-Mache Globe with 3D Printed Elements**

*Makers: Mary Kane, Lleyton Ham, Toni Winiker*

We created a sculptural artwork that represents power structures in the American wars in Iraq and Afghanistan. We used painting and a papier-mache-style process as well as 3D printing to create our project.

**ASIA 1-5**

### **Manufacturing a Narrative**

*Makers: Lindsey Robbins, Robert Barber, Bryson Formaggioni*

Our project consists of two styrofoam heads, a cardboard base, and pictures depicting the US-Afghanistan war. We cut out a part of the heads using an electric foam cutting tool and used a hot glue gun to place the heads on the board. We printed numerous pictures of newspapers describing the war and scenes in Afghanistan and used glue to paste the pictures onto the heads and on the board. Our project shows how the media influences the US public into thinking that they are doing good work when in reality they were only damaging the country and many innocent civilians. This project depicts two different perspectives of the war.

**ASIA 1-6**

### **PTSD: A Two-Faced Phenomenon**

*Makers: Peyton Randolph, Thomas Gibert, Neal Kapur*

Our artwork highlights the effects and causes of PTSD among survivors of war. However, these survivors do not just consist of war veterans themselves, but also civilians living in the communities in which these wars take place.

**ASIA 1-7**

### **3D Resin Structure that Displays the Aftermath of Middle Eastern Wars**

*Makers: Liz Boldt, Oliver O'Brien, Ryan Baxter*

We made a resin brick-like structure that contained 3-D printed figures and artifacts that we felt represented the three different Middle Eastern Wars that we discussed in our class. We used the 3-D printer at the Makerspace.

**ASIA 1-8**

### **3D Print and Cardboard Perspective War Scene**

*Makers: Eliza Ellerbe, Elke Gill, Caleb Burr*

We made a cardboard and 3D printed war scene that depicts the perspective of the Iran-Iraq war through the "lens" of America and Iraq. We used many tools such as paint, 3D pens, cardboard, sand, and foam to create this piece.

## CLASS PROJECTS: DRAM 588

**DRAM 1-1**

### Laser-Cut Stays

*Maker: Matty Blatt*

These are stays made of vegan leather with a laser cut design throughout the sides and stomach. The laser cutter accomplishes the work that could not be done otherwise, and in an efficient amount of time. The stays were patterned and fitted first, then converted to an illustrator file and laser cut. The pieces were then stitched together and dyed/finished.

**DRAM 1-2**

### Laser-Cut Monstress Mask

*Maker: Jocelyn Chatman*

Design comes from the character Desteria from the comic Monstress by Marjorie Liu. The mask was laser cut from vegetable tan leather for my Masks and Armor class. I drew the design in Photoshop then transferred the file to Adobe Illustrator and turned it into an AI. I did a test on cardboard then did the final cut on leather.

**DRAM 1-3**

### Laser-Cut Armor for Theater

*Maker: Athene Wright*

Inspired by contemporary Chinese costuming, this project features traditional leather working techniques combined with laser cut tracery to produce a highly unique set of armor. This project was created for a course offered by the department of Dramatic Arts focusing on the production of masks, mascots, and armor.

## CLASS PROJECTS: NSCI 405

**NSCI 1-1**

### 3-D Print Model of ONC201 Interaction with Dopamine Receptor

*Makers: Baird Cotsakis, Bryson Curtis, Charlotte Seymour, Sylwia Pietrzak, Chandler Chapman*

As a project for the Advance Molecular Neuropharmacology (NSCI 405) course, our group 3D printed and assembled a model of a dopamine receptor interacting with the novel ONC201 drug. We used magnets, flexible wire, and 3D printed structures to create a functional model of the conformational changes that occur when ONC201 binds on a dopamine receptor. We aimed to exhibit the bitopic binding of ONC201 drug and its effect on the structure of the dopamine receptor as a whole.

**NSCI 1-2**

### Etizolam Binding Mechanism

*Makers: Shera Furigay, Amelia Lee, Emmanuel Johnson, Patrick Kramer, Cate Park*

We made a ligand receptor that represent binding with the novel drug etizolam. We made it as a visual representation of the project and how that mechanism work in 3D. We made this using tinkercad and 3D printer in BeAM.

**NSCI 1-3**

### **Hydroxynorketamine Binding to AMPA Receptor 3D Print**

*Makers: Tori Cordero, Jonathan Liao, Noah Rooslet, Mei-Ann Brock*

This project was done as part of the NSCI 405 Course at UNC in order to have a better understanding of the mechanism of action of a novel drug. We chose Hydroxynorketamine because of shared interest in its clinical applications related to depression and schizophrenia. Our model was constructed through 3D printing and glued together to finalize the structure.

**NSCI 1-4**

### **Model of GPR55 with a Novel Drug, VCE-006.1**

*Makers: Elizabeth Park, Hannah Lang, Isabella Dejohn, Shanly Vong*

We made a 3D model of our receptor and drug of interest to demonstrate drug interactions with a specific receptor and illustrate their novel mechanism of action. We used the BeAM Makerspace to 3D print our receptors and drug as well as materials such as magnets and wires to put our model together and show drug and receptor interactions. Our process included researching information about our receptor and drug, coming up with sketches and the design of the receptor and drug and the printing of the 3D model.

**NSCI 1-5**

### **Combined use of in silico methods & 3D-printing in the application of neuroHIV**

*Makers: Alexander Irmischer, Isabella Colon, Hannah Corns, Elizabeth Kim*

Given the marked potential of the endocannabinoid (eCB) system to exude anti-inflammatory and neuroprotective properties in various animal and human studies, we anticipate that CB1 (and ZCZ011) are promising therapeutic targets for treating the effects of the HIV-1 infection in the CNS (neuroHIV). ZCZ011 is a brain-penetrant, cannabinoid receptor CB1-selective positive allosteric modulator (PAM) that enhances the orthosteric agonist CP55,940. With use of in-silico methods, we illustrate how ZCZ011 can increase the expression of CB1R relative to binding pockets on CB1R that lack a bound allosteric modulator. We will be presenting a 3D-printed model of the CB1R to help explain the drug-receptor interaction and protein conformational changes to visualize the therapeutic potential of ZCZ011.

**NSCI 1-6**

### **3D-Print Model of Interactions of GABA and Etizolam with GABA-A Receptors**

*Makers: Amelia Lee, Shera Furigay, Cate Park, Emmanuel Johnson, Patrick Kramer*

We used Tinkercad and Ultimaker Cura to create a 3D-printable model that shows how GABA-A receptors interact differently with its endogenous ligand, GABA, and a drug targeting GABA-A receptors called Etizolam. This model was created throughout the semester with outside research and material learned in NSCI405.

**NSCI 1-7**

### **3D-Print Model of Interactions of GABA and Etizolam with GABA-A Receptors**

*Makers: Anelle Ladson, Shaurya Jamwal, Hallie Rouse, Mihir Kaikini*

We made a simplified version of the 5-ht<sub>2a</sub> receptor using cylinders to portray the binding of a novel agonist. The receptor includes a second site to show the alternative beta-arrestin pathways the agonist induces. The receptor was modeled in TinkerCad and 3d-printed.

## CLASS PROJECTS: PHYS 395

### PHYS 1-1 **LCD 3D Printer** *Maker: Cyrus Pair*

This is a 3D printer that uses ultraviolet light and an LCD screen to harden a resin, layer by layer. I made this for Physics 395, using the FDM printers and the laser cutter available at BeAM.

## CLASS PROJECTS: PSYC 330

### PSYC 1-1 **Piercing-friendly Pillow** *Maker: Rachel Niemira*

I made a pillow using the sewing machines that elevates the head to keep pressure on the ear when laying down.

### PSYC 1-2 **3D Printed Nut and Bolt for PSYC 330 Pain Point** *Maker: Jasmine Guy*

I 3D printed a nut and bolt for my PSYC 330 class. The purpose behind printing it was that I have a tension rod shower shelf and the shelves always seem to fall down, so I created a prototype to prevent the shelves from falling.

## PARTNER ORGANIZATIONS

### PART 1-1 **RYOBI Tools**

As one of the world's largest & most innovative power tool manufacturers, RYOBI specializes in making pro-featured power tools truly affordable. That's why RYOBI is the brand of choice for millions of homeowners & value-conscious pros. We have built our reputation by manufacturing power tools that increase your purchasing power and expand your capabilities. Today, RYOBI Power Tools offers you more pro feature, affordable power tools than ever. We're proud to sell our tools exclusively through The Home Depot. Join #RYOBINation at [www.ryobitools.com/nation](http://www.ryobitools.com/nation) to stay connected!

### PART 1-2 **ShopBot Tools**

Founded in 1996 in Durham, North Carolina, ShopBot Tools, Inc., designs, manufactures and distributes CNC (Computer Numerically Controlled) routers for milling, drilling, and cutting of wood, plastic, metals and other materials -- powerfully, precisely, and affordably. Now in our 25th year of technology innovation, ShopBot's digital fabrication tools are carving out the

future of manufacturing, production, prototyping, grassroots "making," and education. Today, over 10,000 ShopBots are at work in small shops and larger production facilities across the U.S. and around the world. They are used in a range of production operations: plastic trimming, aluminum drilling, signmaking, cabinetmaking, and all types of woodworking, as well as in the production of stealth fighters and manufacturing hi-tech housing.

### **PART 1-3 Kenan Science Library Research Hub and Makerspace**

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 1-4 Carolina Drone Club**

The Carolina Drone Club encourages students to build and fly unmanned-aerial-systems for leisure, or to aid in the production of art or science. On display are two racing drones built with off-the-shelf electronics, custom-cut carbon fiber frames, and many zip-ties. Used in FPV racing, they are highly maneuverable, going 0-60mph in less than a second.

## **BeAM Staff Showcase**

### **BEAM 1-1 BeAM Textiles Extravaganza** *Makers: BeAM Staff Members*

This exhibition shows off the variety of textiles work done by BeAM staff members in the Makerspace this semester and advertises new features of the Textiles Room, including patterns and guides to make fun stuffed animals for any level of sewer!

### **BEAM 1-2 BeAM Staff Design Challenge** *Makers: BeAM Staff Members*

Stop by the BeAM staff table to hear more about the staff-led on-the-spot design challenge!