JOLIE LAI

MECHANICAL ENGINEERING AT PURDUE UNIVERSITY

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DESK ORGANIZER- ME 264 COURSEWORK

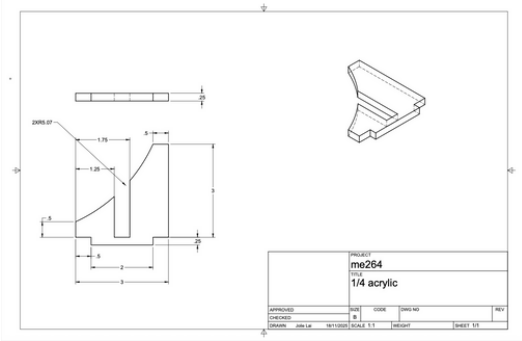
AUG 2025 - DEC 2025

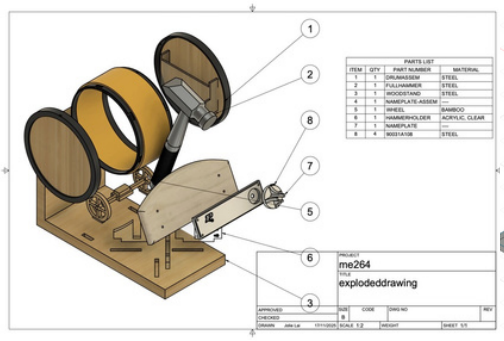
As a final project of ME 264 –Introduction to Manufacturing for Mechanical Design. Students are grouped into teams of 2 to build a desk organizer with the following requirements

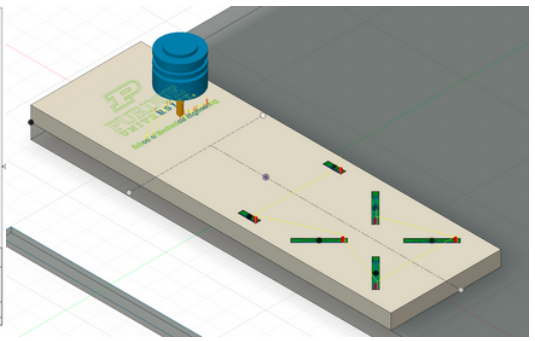
- Include nameplate, fountain, clock, and hammer made in class
- Contain Purdue pride
- Organize your desk in a way
- Only use the given amount of materials

Process:

- Brainstormed ideas using functional decomposition and morphological chart
- Constructed **CAM** program and drawings (exploded, **GD&T**) on **Autodesk Fusion** compliant with **ASME Y14.5 standards.**
- Generate **Bill of Materials (BOMs)** and perform **DFA analysis**
- Created dxf files for laser engraving/ cutting operations on **AutoCAD**







Design Features:

- Purdue's Big Bass Drum that doubles as a hammer stand and clock housing
- Latching mechanism on drum to allow easy access to clock housing for battery exchanges
- Wheels on the drum that acts as pen holders
- Slotted holes to allow easy and precise placement of components
- Male and female parts on the drum and wheel axis to allow the rotation of the drum so the book end can be used on both sides

Next Steps:

- Slight redesigning and manufacturing component
- Assembly
- Documentation and Presentation

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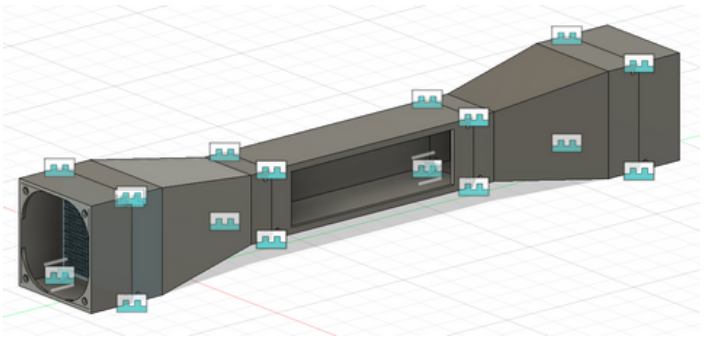
TABLETOP WIND TUNNEL - MULTISCALE MEDICAL ROBOTICS CENTER

MAY 2025- JULY 2025

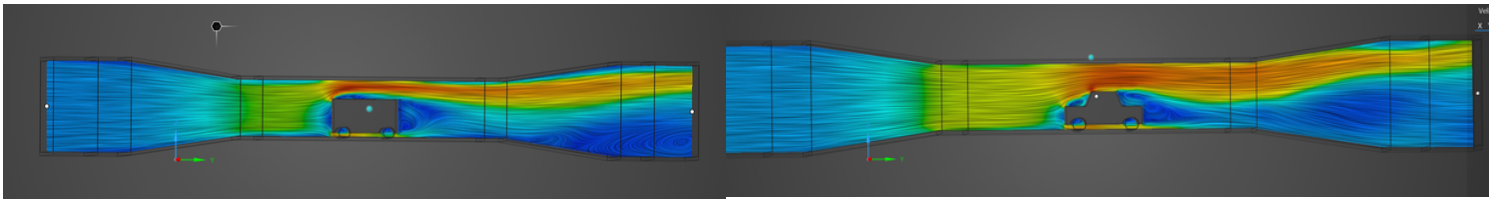
This project is a continuation of my previous work done on wind tunnel design as an Aerodynamics Intern at the Hong Kong University of Science and Technology. Inspired by the Windsible, the goal was to design a prototype that has an **improved quality and accuracy of airflow** compared to the commercial product.



Process:

- Read multiple research articles on tabletop wind tunnel design and performing relevant calculations on component dimensions
- Used **Autodesk Fusion** to **create CAD models**
- Ran **CFD** with **ANSYS**
- Tested out prototypes using **3D printers**
- Reiterated jig design for quality print-in-place prototypes
- Implemented DFA principles to streamline assembly process

CFD Results:



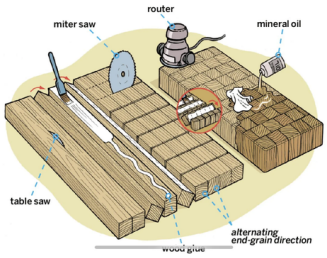
END GRAIN CUTTING BOARD- BECHTEL INNOVATION DESIGN CENTER

NOV 2025

End grain cutting boards are one of the most popular projects in the wood shop at Purdue's Bechtel Innovation Design Center. As a Wood Shop Peer Mentor, this project allows me to be more familiar with the process and to give better advice in the future.

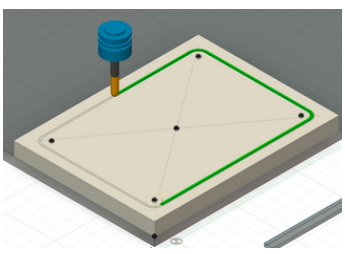
Process:

- Source material (walnut)
- Joint and plane the stock
- Cut it to desired widths with table saw
- First glue up with clamps and wood glue
- Sand with drum sander
- Cut It to desired board thickness with table saw
- Final glue up
- Sand again with drum sander
- **Design CAM program**
- Route juice groove on CNC Gantry
- Finish with mineral oil and wax



General production process

Final product before mineral oil



CAM Program on Autodesk Fusion

Final product after mineral oil