

# Jack Simpson

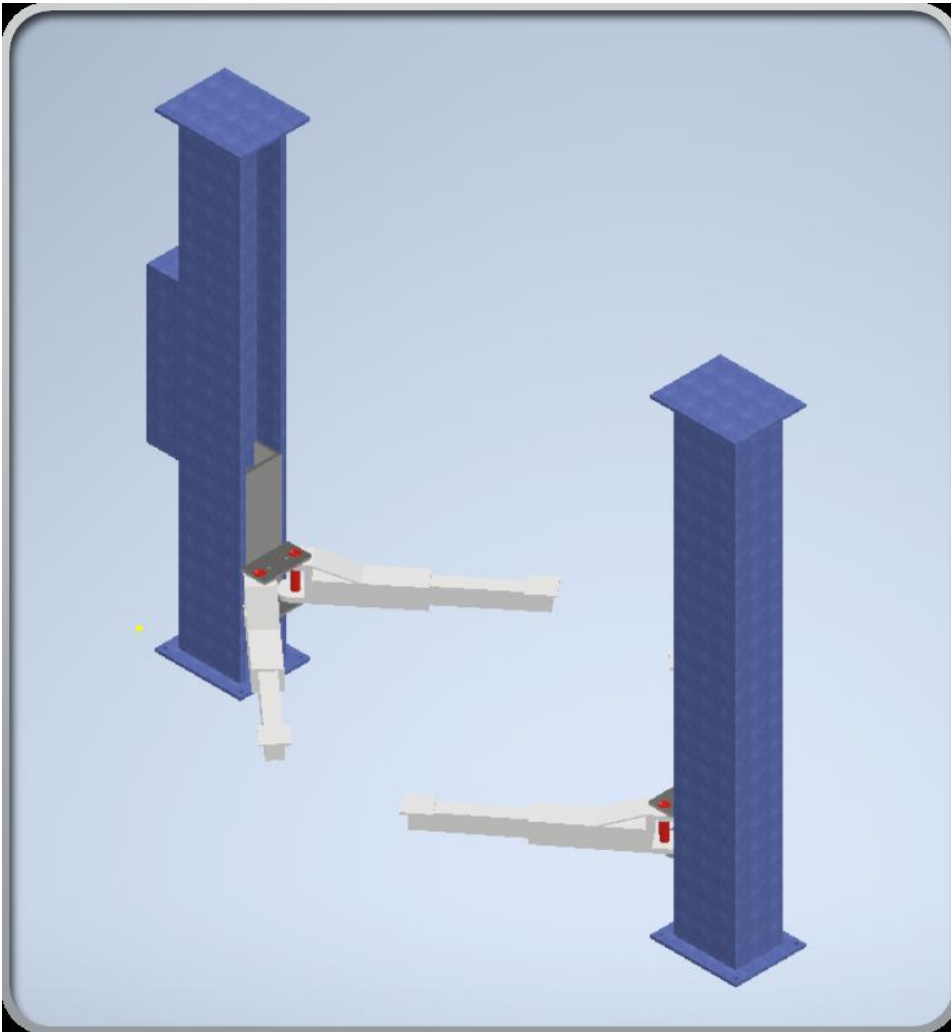
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Mechanical Engineering Portfolio

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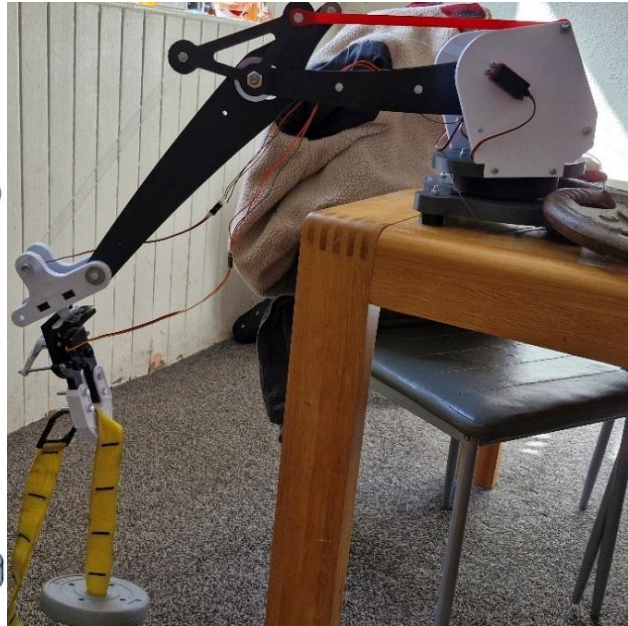
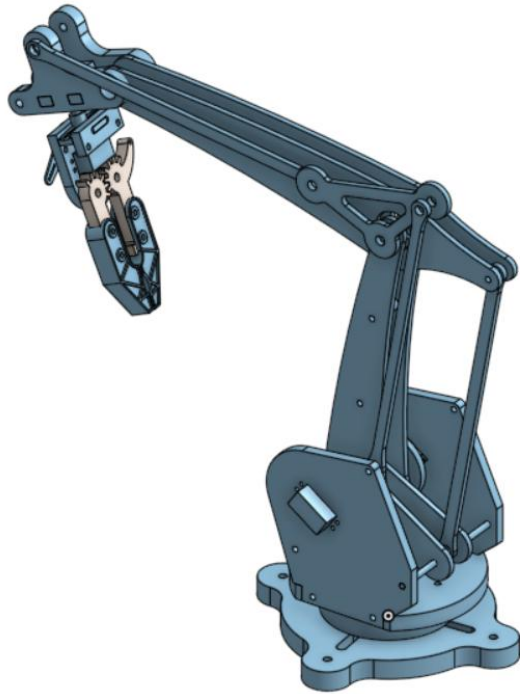
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## Project 1



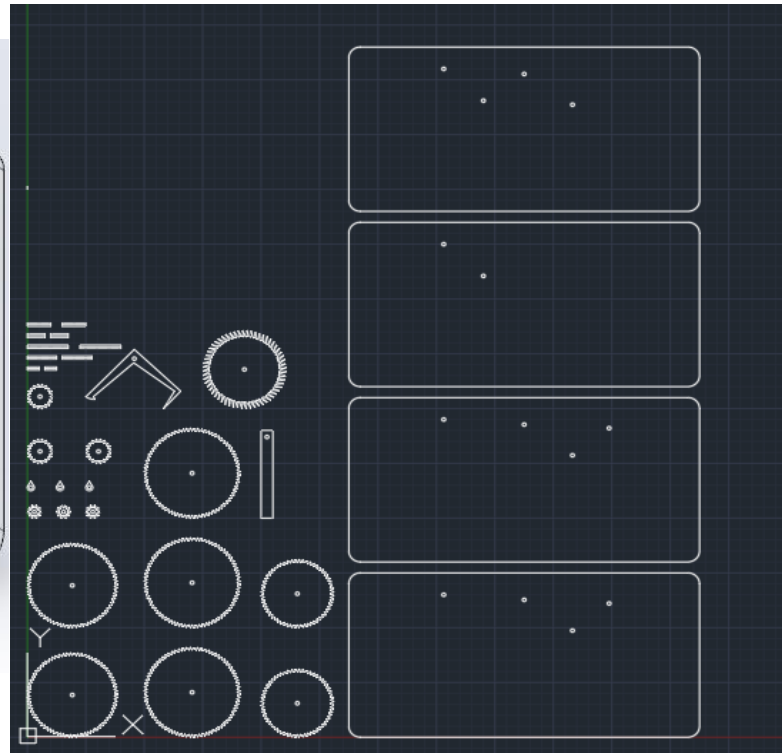
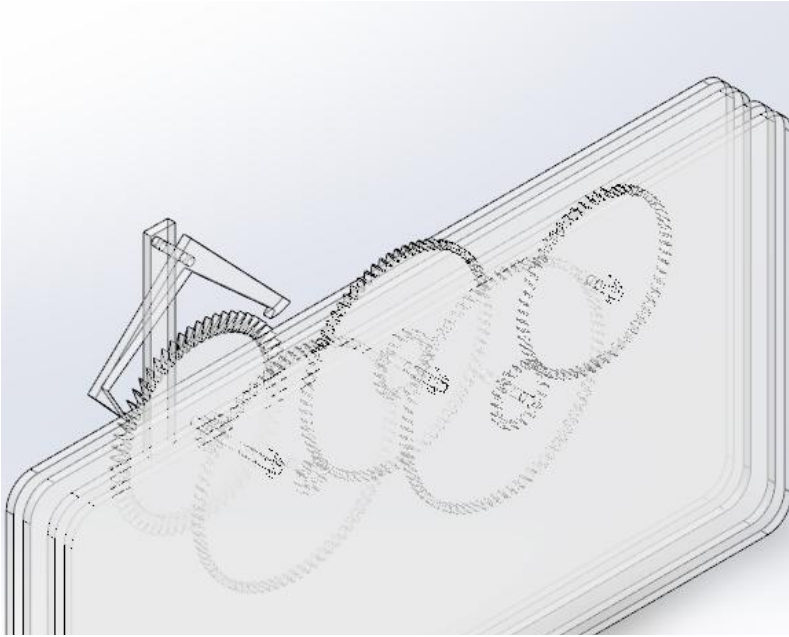
First Project with SolidWorks - Designing a hydraulic car lift for graded unit in college, achieving an A for the final grad.

## Project 2



Honours Project with SolidWorks – Designing a lightweight robotic arm capable of carrying a payload of 1kg. Made with 3D printed materials such as ABS and PETG and programmed using an Arduino to allow for closed loop control with the use of an ultrasonic sensor for object detection.

### Project 3



Crude design of a clock for a project and parts using SolidWorks and AutoCAD - Main outcome for skills was designing motion studies within SolidWorks and timings of mechanical linkages for accurate time keeping.

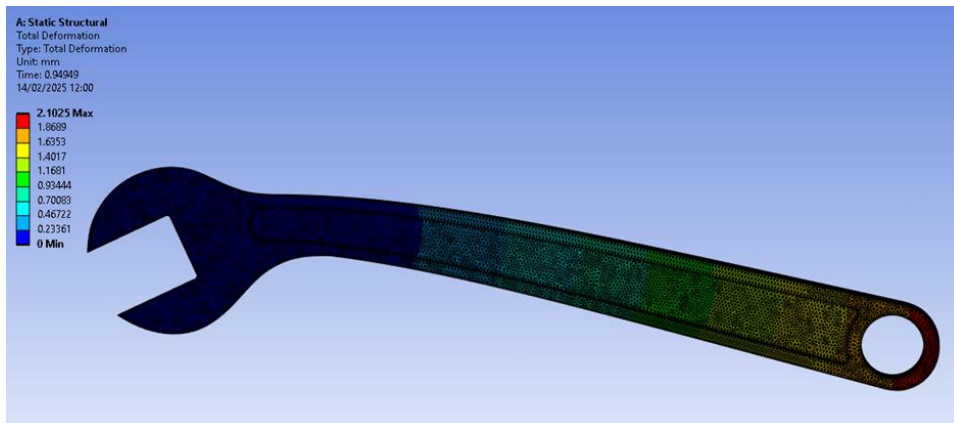
### Project 3



Fabricated a scribe block from bright mild steel – project in college allowed fabrication work with mild steel (milling, drill press, tapping, welding). Some challenges along the way would be the base of the block being poorly cast, having to make use of skills to reinforce.

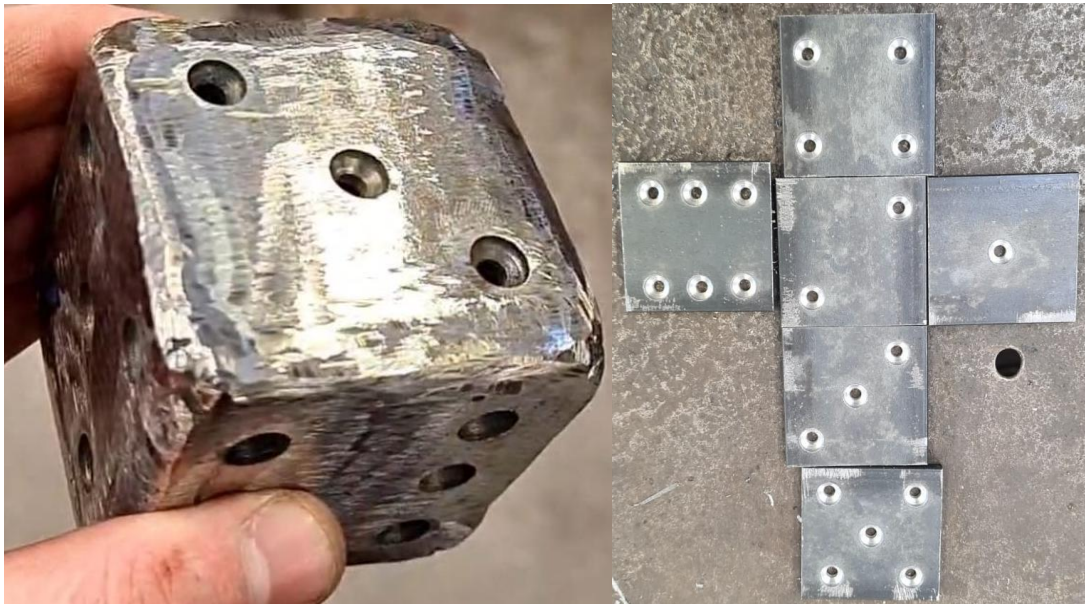


## Project 4



3D model designed and FEA tested in ANSYS space claim – 3D model of a wrench was designed and testing 2 separate materials (Titanium and Steel were chosen for this project), compare the differences between the materials, such as maximum stress & strain, and total deformation. Convergence studies were also performed to achieve the most optimum element size for simulation.

## Project 5



Fabricated a dice and adjustable wrench(not pictured) – within second year of University, a module further developed my fabrication skills. The first project was manufacturing a wrench using a mild steel for the main body and brass for the adjustment wheel. This made use of a fly press to fold a sheet metal plate, to protect the threaded rod as well as create an ergonomic handle comfortable to hold. The second project, the steel die, was to improve MIG welding skills.