



ENDER ALUMNI

WORKFLOW

CAD Pro & Con

December 2023

CAD systems included: TinkerCAD, SolidWorks, Onshape, FreeCAD, IronCAD, Fusion360, SketchUp, Meshmixer, DesignSpark Mechanical



Many CAD Systems, Applications according to Formlabs

INDUSTRY	SOFTWARE
Automotive	CATIA, Siemens NX, Alias, Creo, Rhinoceros
Architecture	AutoCAD, Revit, ArchiCAD, Microstation, SketchUp, Rhinoceros+Grasshopper
Dental	3Shape, exocad, CEREC, OrthoCAD, PlanCAD, Ceramill Mind, Zirkonzahn, Maestro3D, RealGUIDE
Engineering & Product Design	SolidWorks, Onshape, Creo, Siemens NX
Furniture	Cobalt, SolidWorks, Rhinoceros
Fashion	Marvelous Designer, CLO
Footwear	Modo, ICad3D+, MindCAD, Geomagic Freeform, Blender, Rhinoceros
Interior Design	Homestyler, HomeByMe, Virtual Architect, FloorPlanner, RoomStyler
Jewelry	3Design, ZBrush + GemCut Pro, Rhinoceros (+ Grasshopper, Matrix, 2Shapes, Weaverbird, Peacock, and Lunchbox plug-ins)
Manufacturing	Inventor, SolidEdge, SolidWorks
Makerspace / 3D Printing	ZBrush, Mudbox, Fusion360, MeshMixer, Rhinoceros + Grasshopper
Medical	SolidWorks, Inventor, Siemens NX, Spaceclaim, Rodin4D Neo, Adept, Within Medical
Model Making & Entertainment	Maya, 3D Studio Max, Houdini, Modo, Cinema4D, Blender, Daz3D
Landscaping	Vectorworks Landmark, LandFX, Rhinoceros + Lands Design, SketchUp
Research & Education	SelfCAD, TinkerCAD, 3DBuilder, SketchUp, BlocksCAD
Virtual Reality	Maya LT, 3D Studio Max, Creo, SketchUp

Choosing the Best 3D CAD Software: A Comprehensive Guide

30 min | 10 min read

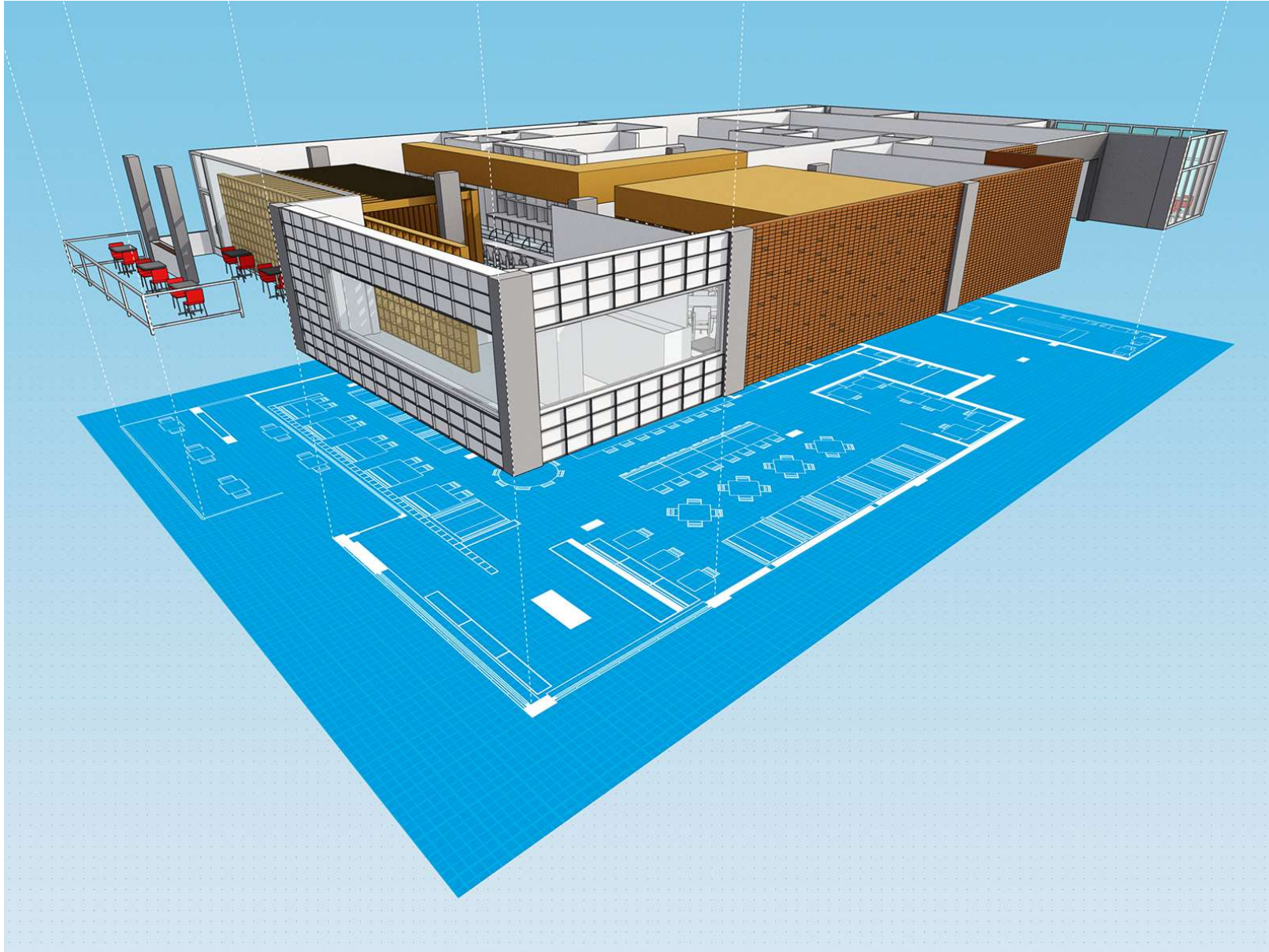
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formlabs.com/blog/cad-software/

The screenshot displays the TinkerCAD web interface. At the top left is the Autodesk Tinkercad logo. The navigation menu includes 'Tinker', 'Gallery', 'Projects', 'Classrooms', and 'Resources'. The user profile 'mcdunnt' is visible on the left sidebar, along with a search bar and navigation options like 'Classes', 'Designs', 'Tutorials', 'Challenges', and 'Collections'. The main content area is titled 'Your designs' and is divided into two sections: '3D Designs' and 'Circuits'. The '3D Designs' section features a '+ Create' button and three tutorial cards: 'Place It' (showing a cube on a grid), 'View It' (showing a red cube with 'TOP', 'FRONT', and 'RIGHT' labels), and 'Move It' (showing a red cube with movement arrows). The 'Circuits' section features a '+ Create your first Circuits design' button and three tutorial cards: 'Start Simulating' (showing a battery and a light bulb), 'Editing Components' (showing an Arduino Uno board with various components), and 'Wiring Components' (showing a breadboard with a circuit). The Windows taskbar is visible at the bottom of the screen.





FreeCAD

freecadsoft.com/en/index.php?gclid=Cj0KCQiA35urBhDCARIsAOU7Qwn0IPb_VaCYS3ip7xkgqK4eA3bZTg9n7cB0RrRycwfsxGR_B5ozANQaAsmzEALw_wcB#

FreeCAD

Features Download Blog Documentation Contribute Community

FreeCAD

Your own 3D parametric modeler

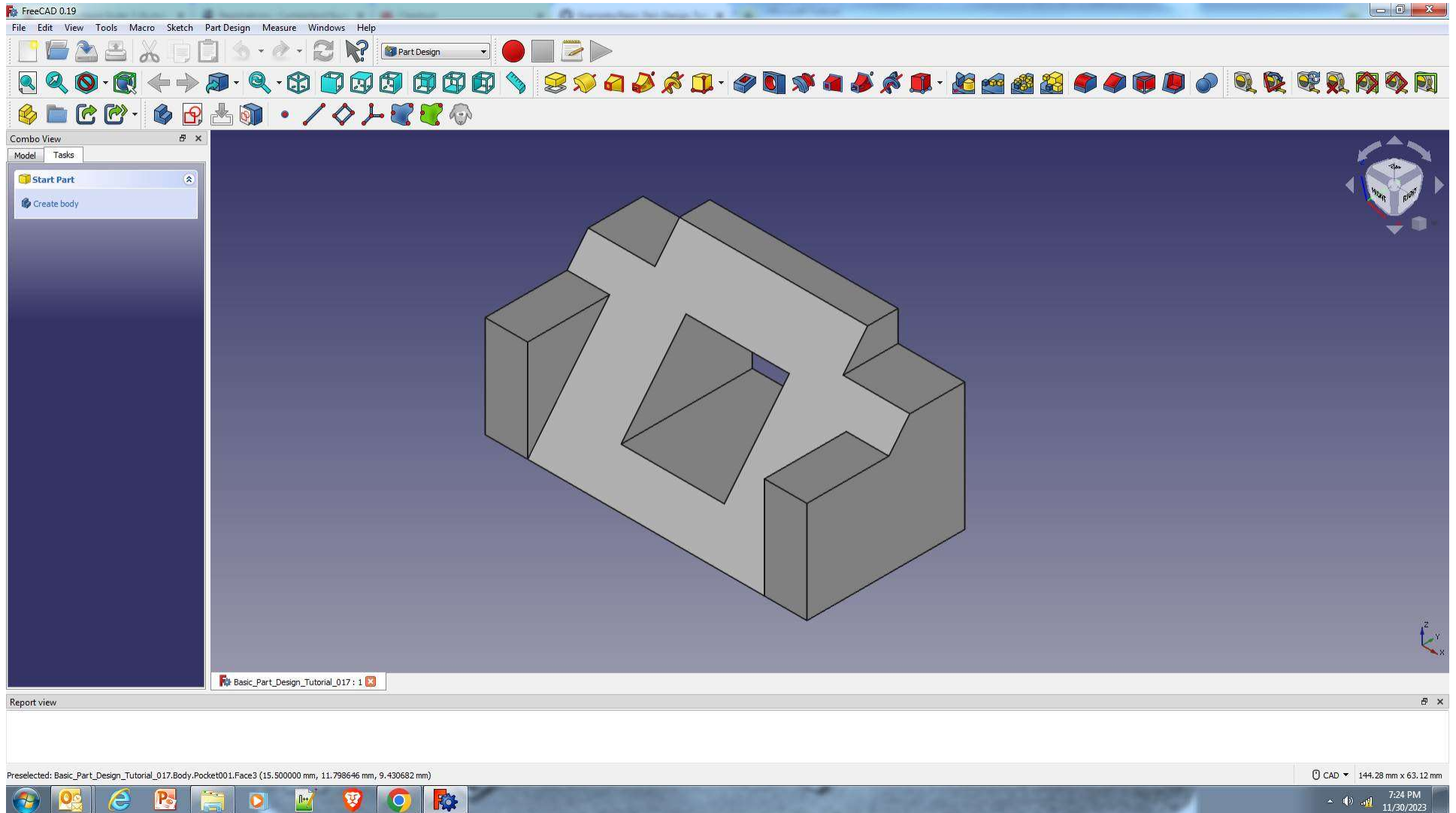
Download now

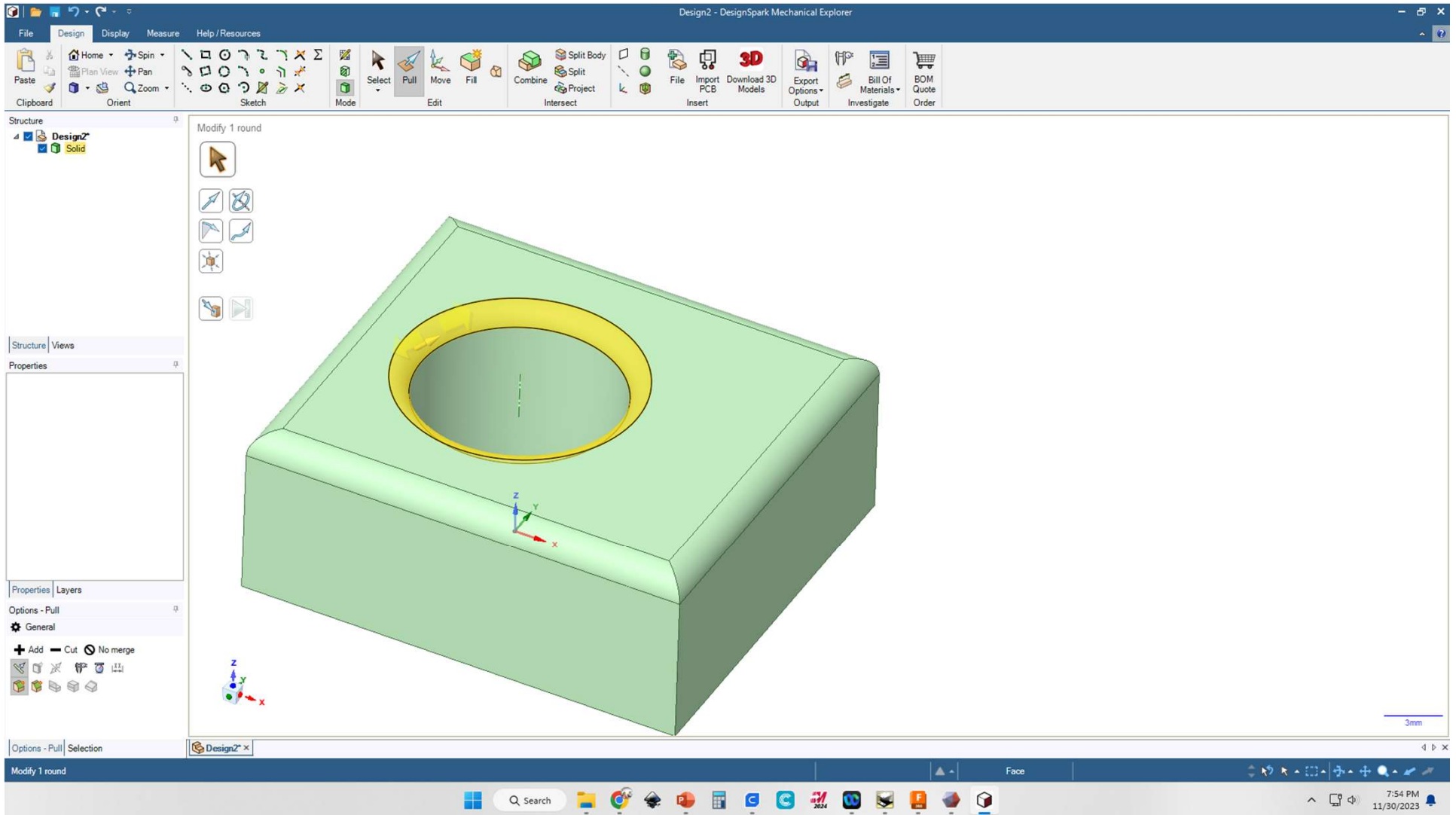
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freecadsoft.com/



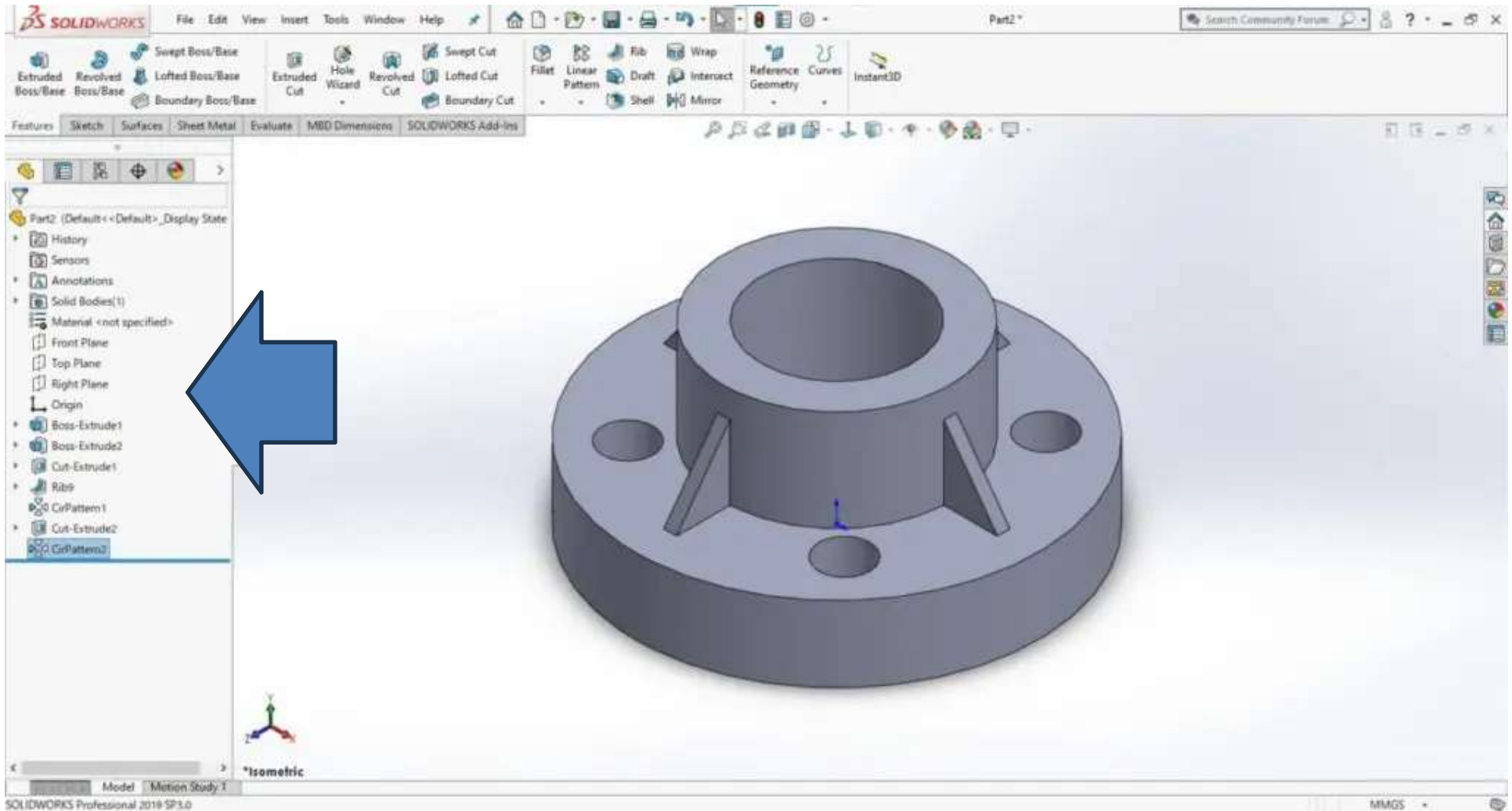
FreeCAD







SolidWorks



GrandDaddy, feature tree, assemblies and animation, FEA



SolidWorks



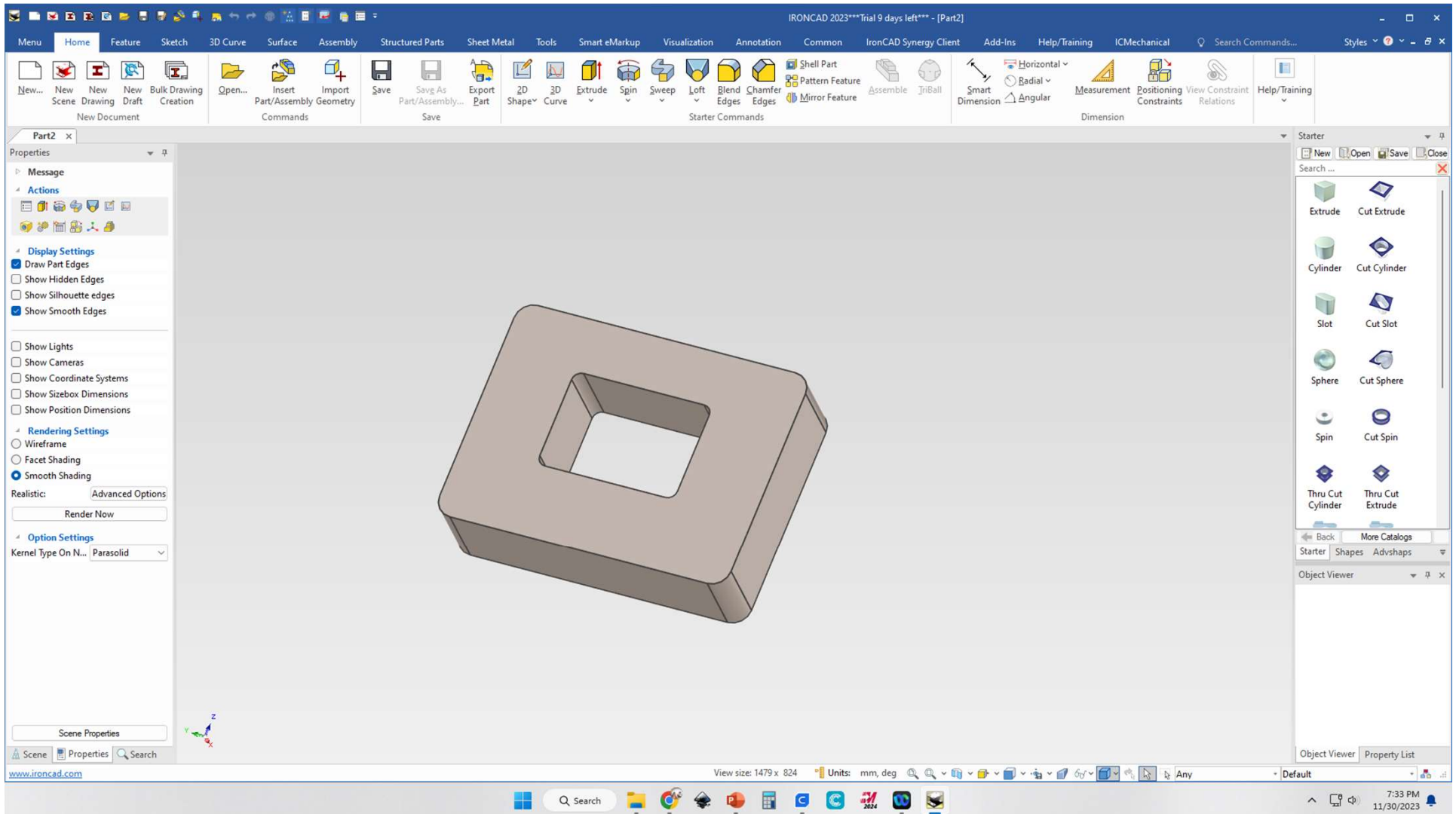
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Study name: SimulationXpress_Study(-Default-)
Plot type: Static nodal stress Stress
Deformation scale: 1.26325

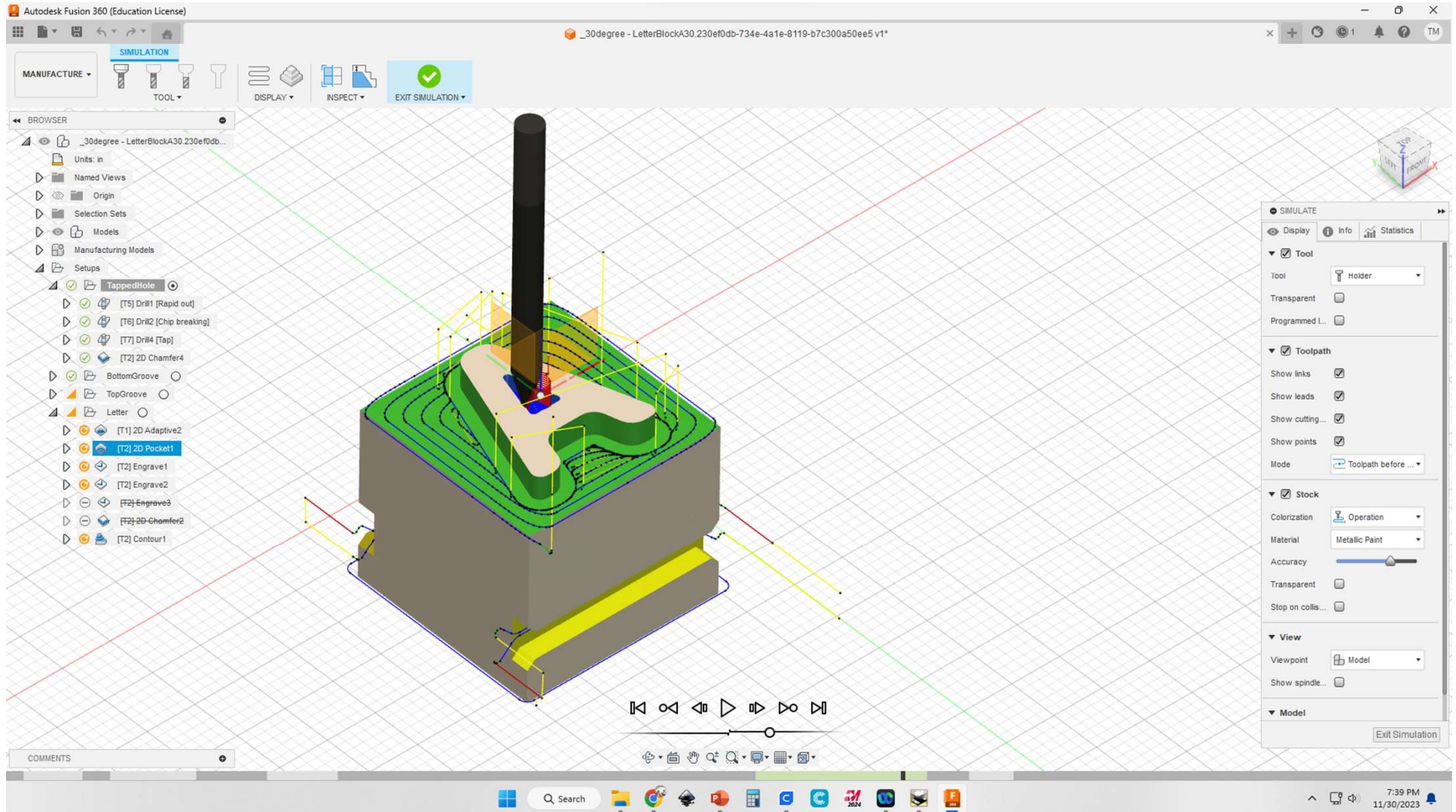
von Mises (N/m²)

3,000,000,000.0
2,750,143,744.0
2,500,287,744.0
2,250,431,488.0
2,000,575,360.0
1,750,719,232.0
1,500,863,104.0
1,251,006,976.0
1,001,150,784.0
751,294,656.0
501,438,496.0
251,582,352.0
1,726,213.1

→ Yield strength: 1,050,000,000.0

Turning simulation results into colored 3D prints

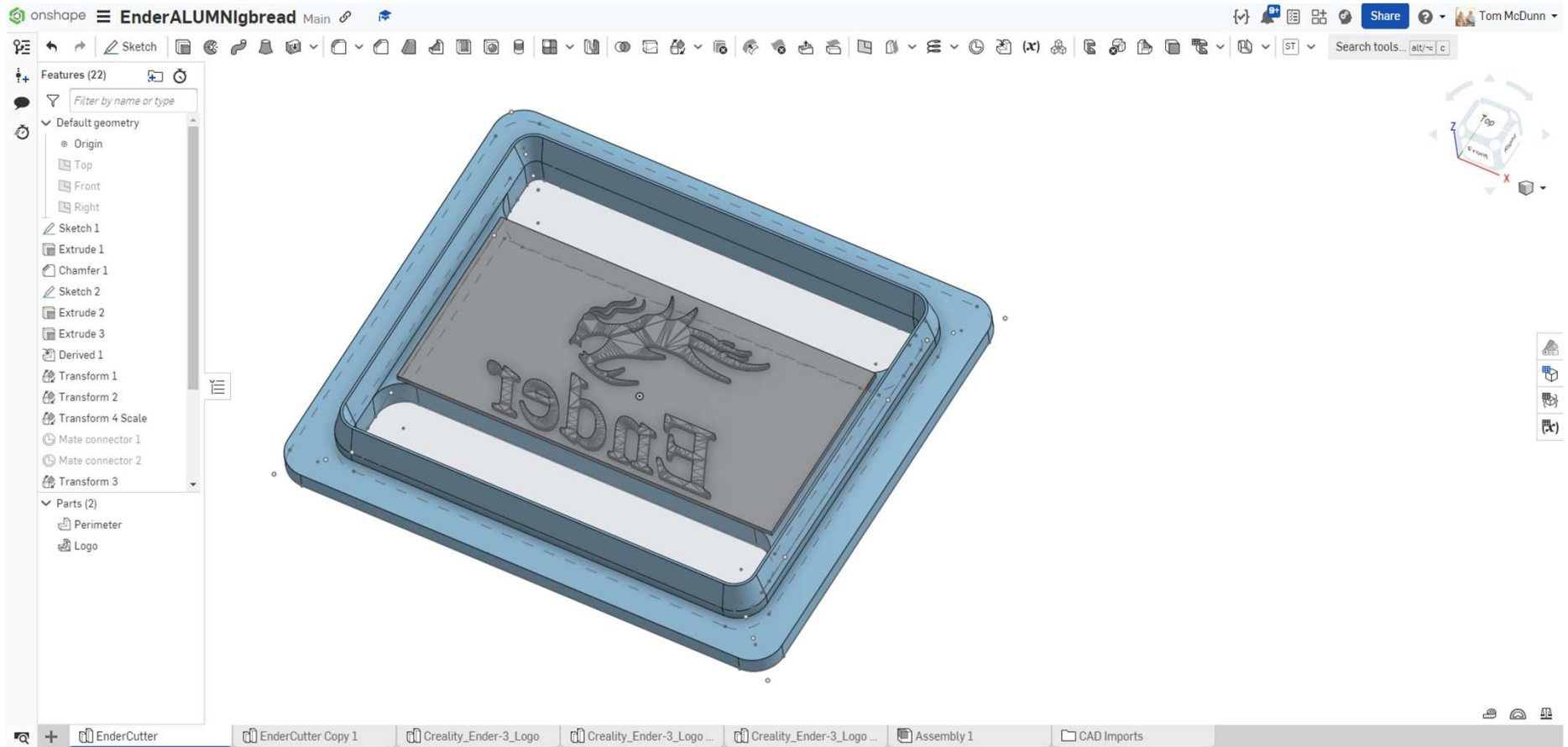




Solid Modeling, Good CAM extensions



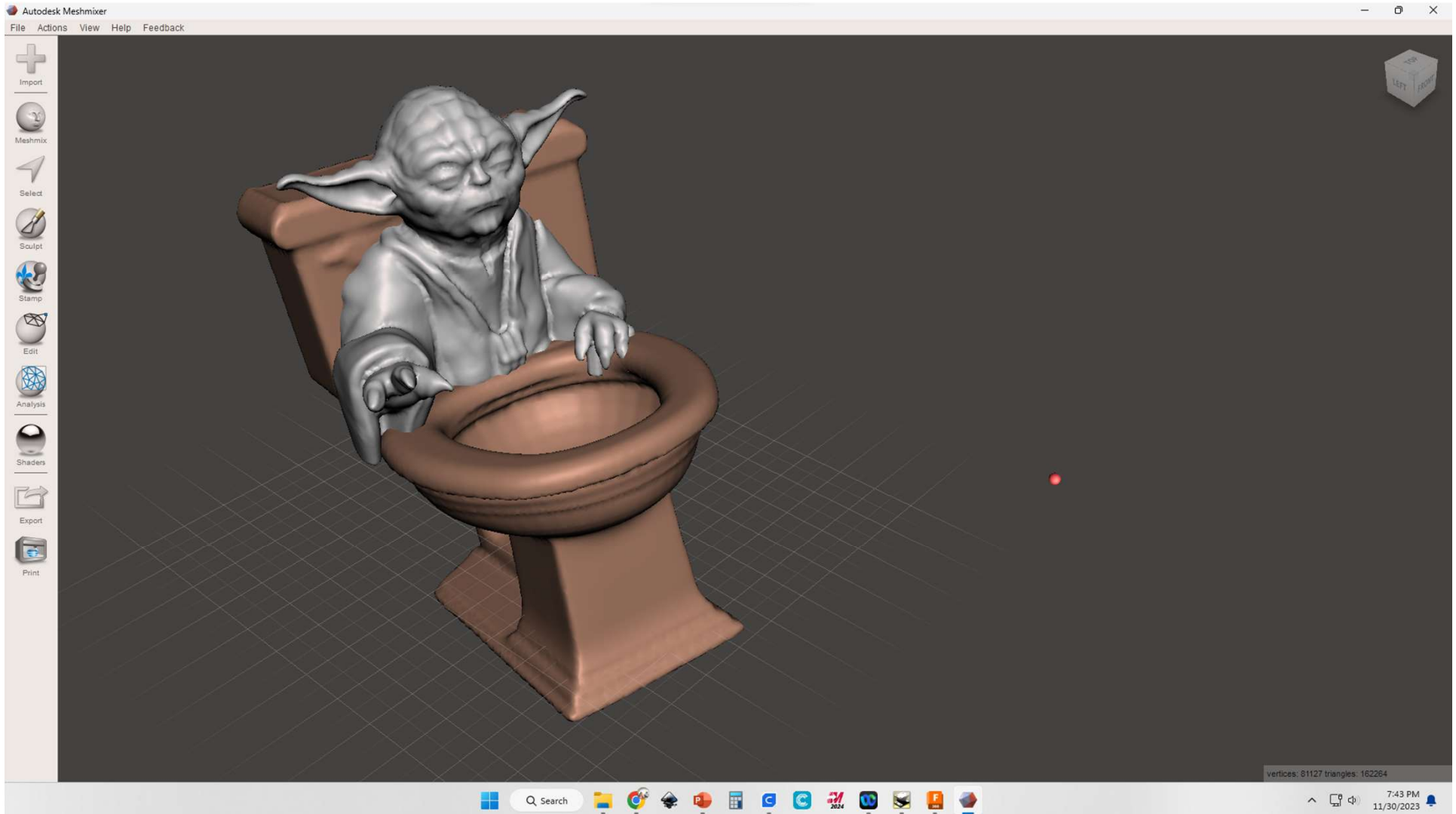
Onshape



Parts/Assemblies and animation/Drawing, Some ability to mix stl and solid model



MeshMixer



Good for stl manipulation, sculpting, cleaning up scans



Summary

CAD Package	Best Feature	PRO	CON
TinkerCAD	Dimensions	FREE! Drop & Drag Electrical Simulator Tutorials – Browser Based	Can't fillet or chamfer edges
Sketchup	Floor Plan	Inexpensive	Started as 3D building maker for Google Earth
FreeCAD	OpenSource	FREE! Lots of capability Extendable	Clumsy Structure German origin , things get lost in translation Website redo doesn't work
DesignSparkMechanical	Marries to PCB design	Free Can do Extrude/Sweep/Revolve	Cryptic learning curve
Onshape	Late comer so fresh MMI, Influenced by SolidWorks	FREE! - Browser based Designs/Drawings/Assemblies User Feature Coding Sketch to Extrude	Cloud Based
SolidWorks	Market Leader Built in FEA Many add-ons	Feature Tree Designs/Drawings/Assemblies Sketch to Extrude	Expensive \$1500/seat/yr
Fusion360	Established CAM connection	Newer MMI Extrude/Sweep/Revolve Sketch to Extrude	AutoDesk vacillates on price tag
IronCAD	Combines Drop & Drag with Sketch to Extrude	New Interface Lot's of baked in elements	Expensive! Multiple plans but ~\$1500/seat/year
Meshmixer	Good stl manipulation	Sculpting tools FREE	Age of software Quirky operation