

product DESIGN

OIDD 415 / 515

MEAM 415

IPD 515

Prof. Taylor Caputo

one part

(individual project separate from team project)

Design and 3D print a product that is only
one part.

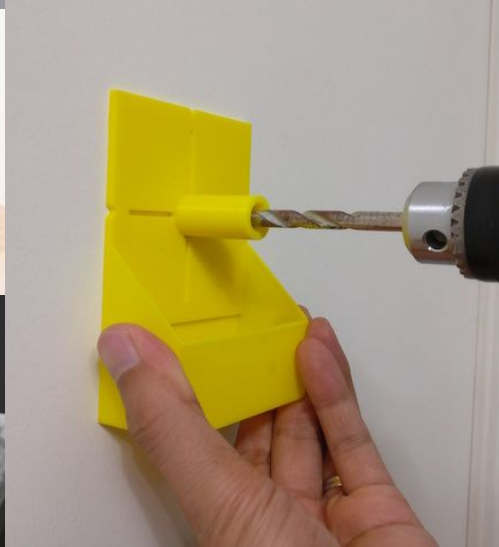
Design and 3D print a product that is only
one part.

The 3D printed prototype must function to complete a task
(can't be just decorative)

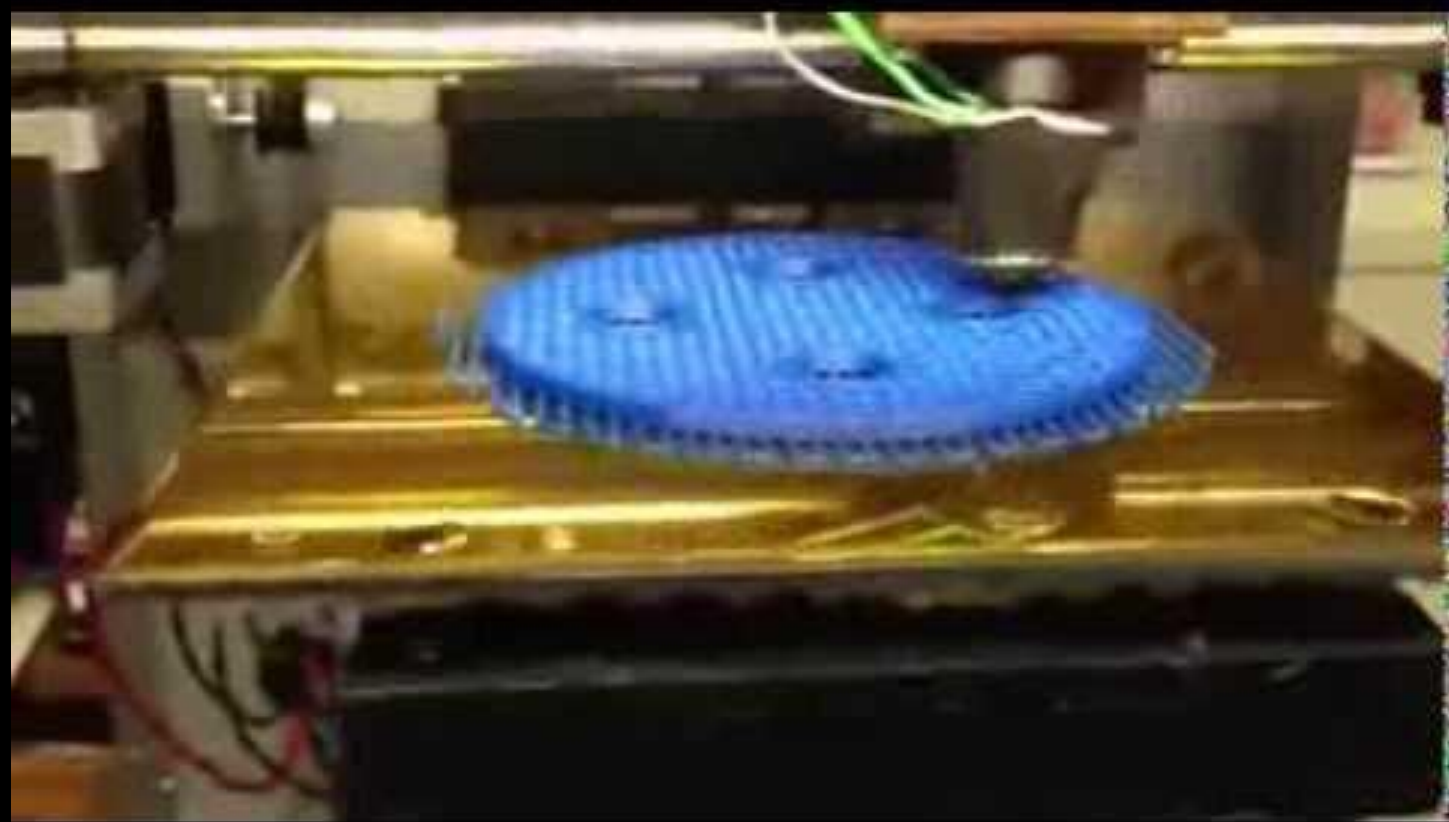
Design and 3D print a product that is only **one part.**

The 3D printed prototype must function to complete a task
(can't be just decorative)

You'll be learning CAD design and designing for 3D printing over the next few weeks.



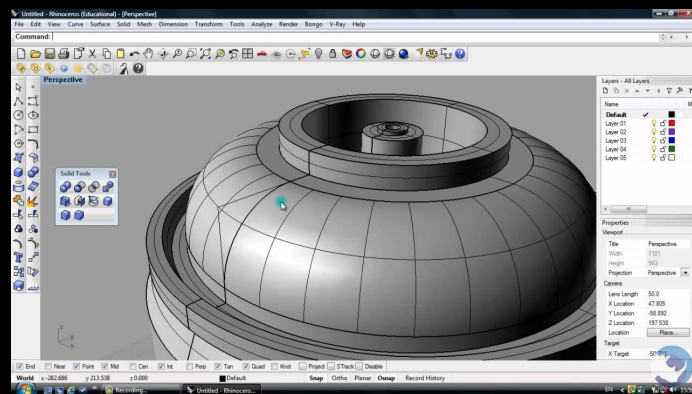
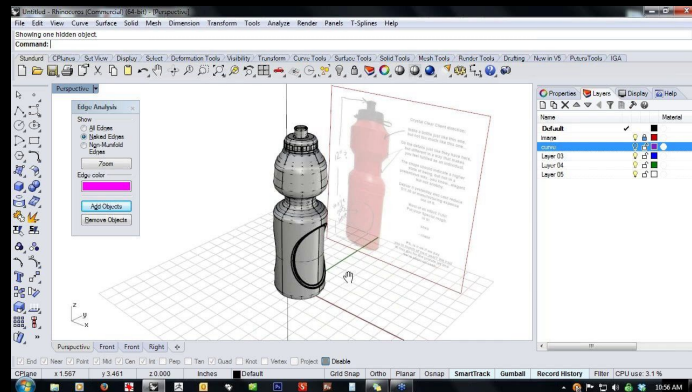
What is 3D Printing?



- teaching tool
- repair
- prototyping
- final product (manufacturing process)

DesignConstraints

- Ask yourself *“is it one part?”*
- Smallest: 25mm x 25mm x 25mm
- Biggest: 75mm x 75mm x 75mm
- Has to have a utility or function
(but no cups, bowls, or vases)
- Designed in Rhinoceros 3D

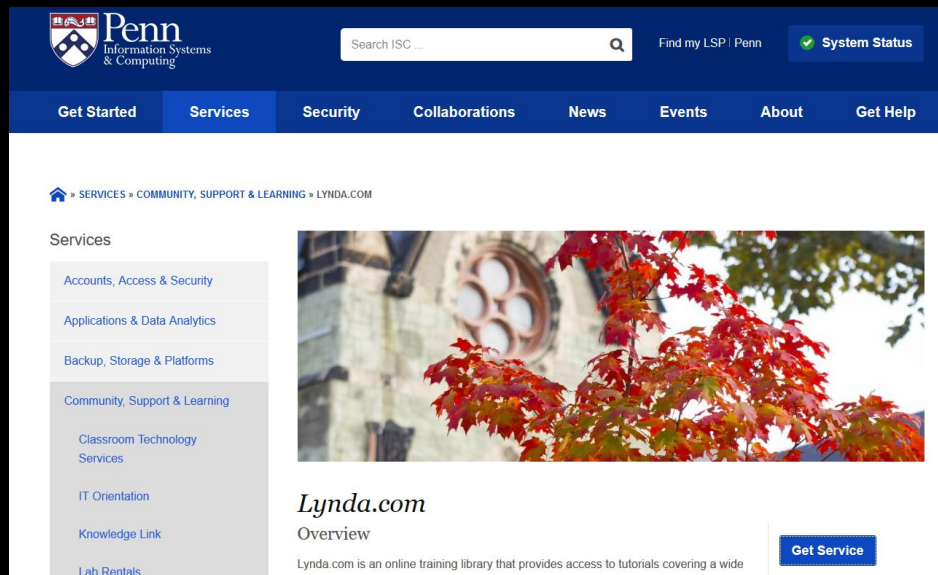


WhyRhino

- **Versatile:** Used in Product Design, Industrial Design, Automotive, Jewelry, Architecture
 - Surface Modeling (complementary to Solidworks skills)
 - Any physical scale of projects
- **Accessible:** available in all SEAS computer labs, free 90 day trial for Windows and Mac
- **Good for beginners:** lots of online resources, but not too amateur (a marketable skill)
- **Translates well to 3D Printing**

LearningTools

- **Lynda Tutorial** (sign in through Penn for free access)
- **In class tutorials**
- **In class work time**



The screenshot displays the Penn Information Systems & Computing website. The header features the Penn logo, a search bar, and links for 'Find my LSP | Penn' and 'System Status'. A navigation menu includes 'Get Started', 'Services', 'Security', 'Collaborations', 'News', 'Events', 'About', and 'Get Help'. The main content area shows a breadcrumb trail: 'SERVICES » COMMUNITY, SUPPORT & LEARNING » LYNDA.COM'. A sidebar lists various services, with 'Community, Support & Learning' selected. The main content area features a large image of red maple leaves and the 'Lynda.com Overview' section, which includes a description of the online training library and a 'Get Service' button.

Penn Information Systems & Computing

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Get Started Services Security Collaborations News Events About Get Help

» SERVICES » COMMUNITY, SUPPORT & LEARNING » LYNDA.COM

Services

- Accounts, Access & Security
- Applications & Data Analytics
- Backup, Storage & Platforms
- Community, Support & Learning
- Classroom Technology Services
- IT Orientation
- Knowledge Link
- Lab Rentals

Lynda.com
Overview

Lynda.com is an online training library that provides access to tutorials covering a wide

Get Service

Rhino 5 Essential Training


[Overview](#) [Transcript](#) [View Offline](#) [Exercise Files](#) [FAQs](#)

Author



Dave Schultze

Released 11/1/2013 [CC](#)

Rhino is a 3D-modeling powerhouse, used to design and engineer products ranging from jewelry and furniture to architecture and automobiles. Learn how to build your own 3D models, characters, and prototypes with the NURBS-based modeling tools in Rhino 5.0 for Windows. Author Dave Schultze introduces Rhino's three primary entities (the curve, the surface, and the solid) and shows the best ways to draw curves and model 3D objects, edit their geometry efficiently, and render and export your designs.

Topics include:

- Why use Rhino?
- Understanding 3D terminology
- Comparing Bézier curves, B-splines, and NURBS objects
- Navigating the viewport
- Manipulating objects with commands
- Creating curves, surfaces, and solids

Skill Level
Beginner

7h 10m

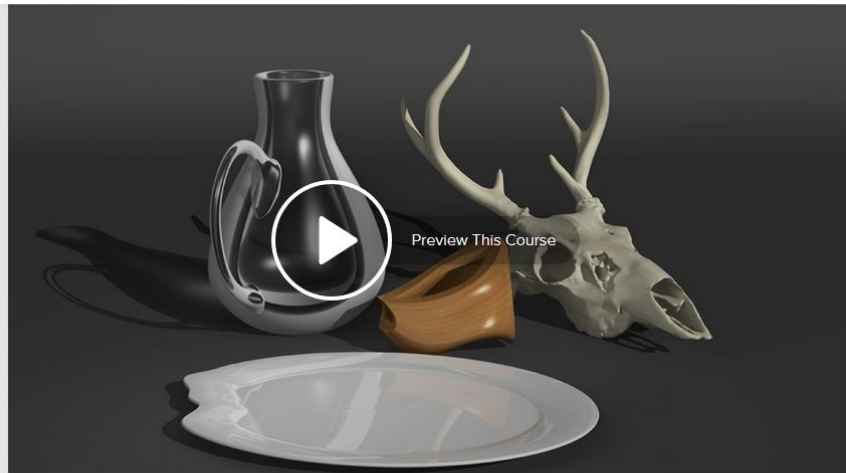
Duration

1,428,131

Views

What is Rhino for Mac?

From: Learning Rhino for Mac



About this video

Join Chris Reilly for an in-depth discussion in this video What is Rhino for Mac?, part of Learning Rhino for Mac.

[Overview](#) [Transcript](#) [View Offline](#) [Exercise Files](#)

Author



Chris Reilly

Released 12/9/2015 [CC](#)

Rhino for Mac is here. While it doesn't have the exact same features as its Windows counterpart, Rhino for Mac offers a compelling 3D modeling experience for designers who prefer to work in the Mac environment. This short course covers the key differences between the Mac and Windows versions, basic interface navigation, 3D modeling, lighting, and rendering. Author Chris Reilly builds from viewing models to creating complex geometry from simple points and curves to extruding solid objects for 3D printing. No prior experience with Rhino is required! Simply start watching to get up and running with this powerful 3D modeling software.

Topics include:

- Installing Rhino for Mac
- Viewing a 3D model in Rhino 5
- Manipulating objects with commands
- Creating curves, surfaces, and solids
- Applying transformations to 3D objects

Skill Level
Beginner

7h 25m

Duration

155,808

Views

Rhino 5 Essential Training

[Overview](#) [Transcript](#) [View Offline](#) [Exercise Files](#) [FAQs](#)

Author



Dave Schultze

Released 11/1/2013

Rhino is a 3D-modeling package used by architects, engineers, and furniture to architectural models, automobiles, and prototypes with the software. Dave Schultze introduces Rhino 5.0, the primary and the best ways to draw and model 3D objects and export your designs.

Topics include:

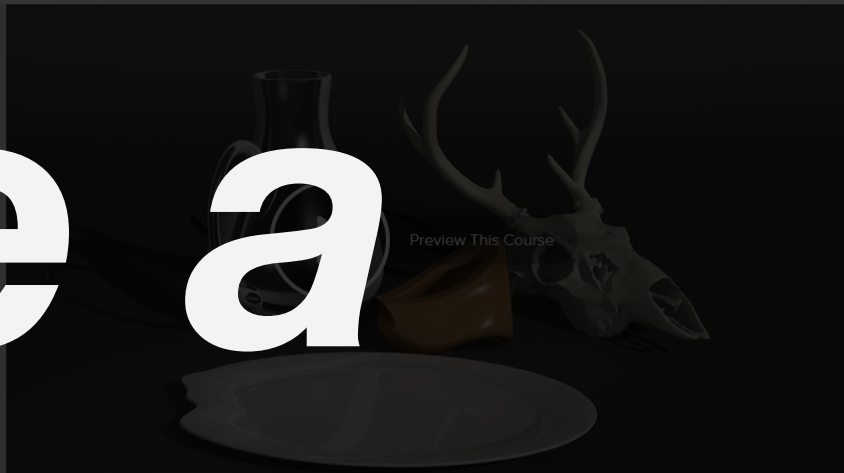
- Why use Rhino?
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What is Rhino for Mac?

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Preview This Course

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Join Chris Reilly for an in-depth discussion in this video What is Rhino for Mac?, part of Learning Rhino for Mac.

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Released 11/1/2013

Rhino for Mac is here. While it's not the exact same as its Windows counterpart, it's a great alternative for designers who prefer to work in the Mac environment. This short video shows the differences between the Mac and Windows versions of Rhino 5.0, including the new modeling, lighting, and rendering. Author Chris Reilly builds on his previous work in the series, showing how to use geometry tools, points and curves to extruding and creating 3D models. Simply start watching to learn more.

- Installing Rhino for Mac
- Viewing a 3D model in Rhino 5
- Manipulating objects with commands
- Creating curves, surfaces, and solids
- Applying transformations to 3D objects

Skill Level
Beginner

7h 25m

Duration

155,808


Views

Windows, Chapter 1-10
(preferred)

Mac, Chapters 1-7

- All SEAS Computer labs (30 floating licenses)

https://www.rhino3d.com/download



Rhinoceros®
design, model, present, analyze, realize...

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Downloads

For Windows

Complete install

- **Rhino 6 for Windows - Evaluation** - Try this **full** version for 90 days. After 90 days saving and plug-ins stop working, unless you **buy** a license.
- **Rhino 6 for Windows - Latest Version** - Requires a Rhino 6 license key.
- **Flamingo nXt 5** - next generation rendering for Rhino
- **Brazil** - advanced rendering for Rhino
- **Penguin** - sketch/cartoon rendering for Rhino
- **Bongo** - design animation for Rhino (30 day eval)
- **The Zoo** network license manager (free)

Work-in-progress (WIP)

- **Serengeti build** - the latest work-in-progress
(Requires a Rhino 6 license key)

Archives

- **Grasshopper** for Rhino 5 - generative design tools
- **Rhino 5 for Windows - Evaluation** - Try this **full** version for 90 days. After 90 days saving and plug-ins stop working, unless you **buy** a license.
- **Rhino 5 for Windows - Latest Version** - Requires a

For Mac

Complete install

- **Rhino 5 for Mac - Evaluation** - Try this **full** version for 90 days. After 90 days saving stops working, unless you **buy** a license key. *Note: Rhino for Mac is **NOT** the same as Rhino for Windows. **Details...***
- **Rhino 5 for Mac - Latest Version** - Requires a license key.
- **The Zoo** network license manager (free)

Work-in-progress (WIP)

- **WIP build** - the latest work-in-progress
(Requires a Rhino 5 for Mac license key)

For iOS

- **iRhino 3D** viewer for native Rhino 3DM files on iOS devices.

Tools

OnePart Schedule

Due Next Studio

One Part Sketch

Start Lynda
Tutorial

(please!)

In Studio Next Week

In Class Live
Tutorial

Spring Break

~March 12th

Finish Lynda
Tutorial

Start Modeling
Object

In Studio ~March 12th

File due for
3D Printing

:'(

Keys to Success

“If you just keep your mind resting against the subject in a friendly but persistent way, sooner or later you will get a reward from your unconscious, probably in the shower later.”

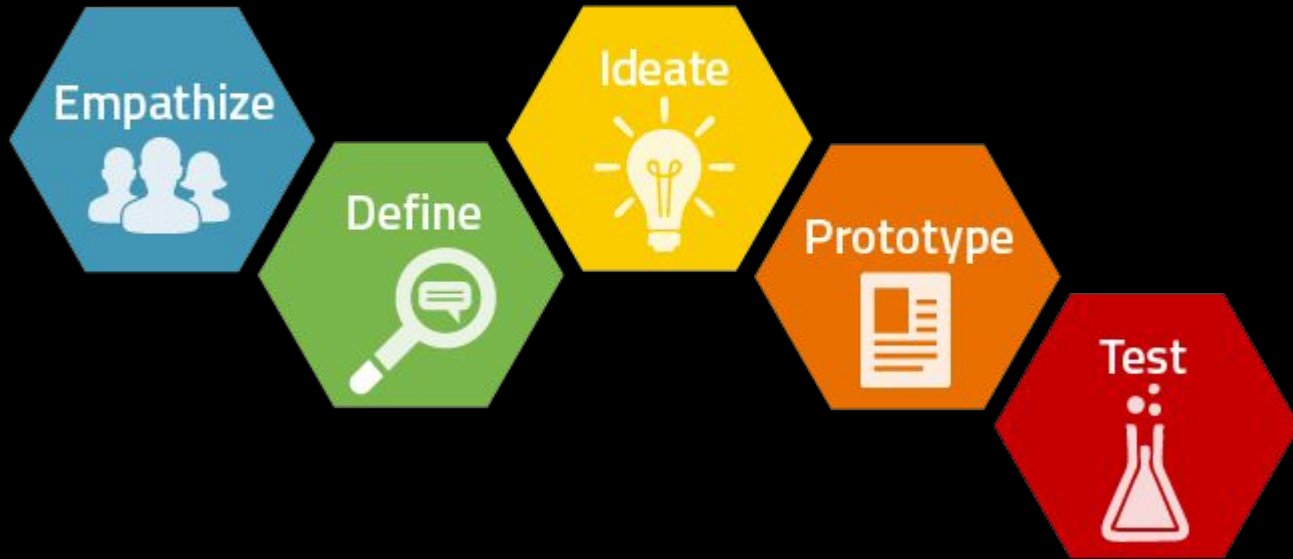
- John Cleese

Class

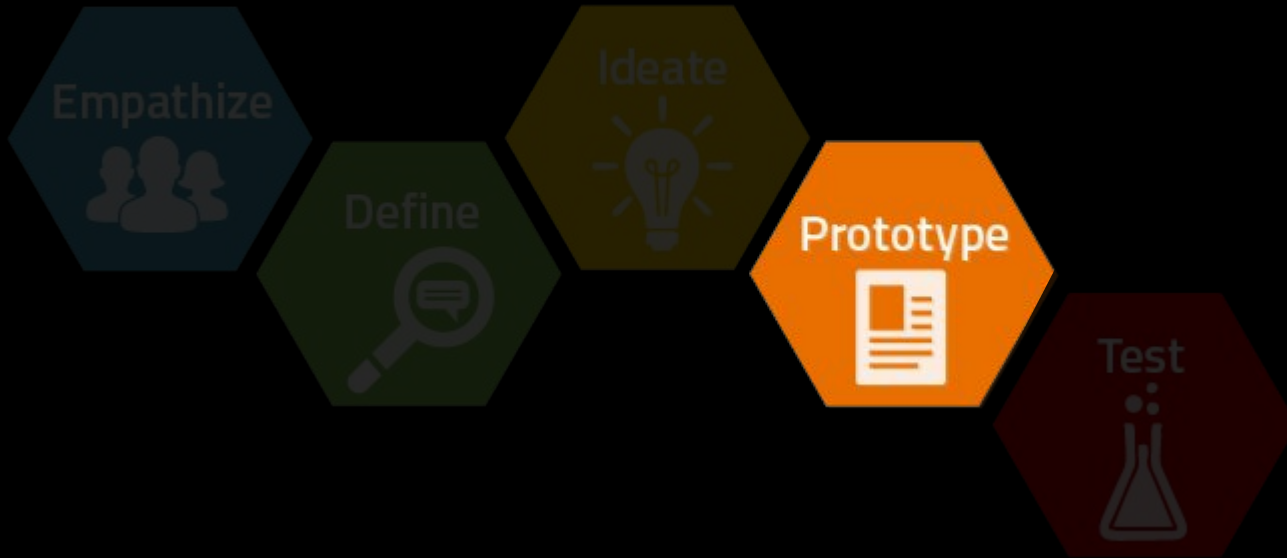
- **Prototyping!**

- Remember, each team member should produce a prototype (so each team will make 2) but you can work together to create them.

DESIGN THINKING



DESIGN THINKING



Expectations for Proof of Concept Prototype...

- Generally made by hand utilizing easily available materials or found objects.
- **Prototyping isn't about making just a model of your idea, but creating an object that is testable in some way.**



Looking Ahead

- If you finish your prototypes in class today, you can start testing
- Create 2 prototypes per team
- 3D Modeling Techniques...start Lynda tutorial!
- One Part Sketch due next week

(Optional):

James Dyson:

How I Built This podcast

