

User Training

BYU Harold B. Lee Library

Harold B. Lee Library / Subject Guides / 3D Printing Guide / Software and Training

3D Printing Guide: Software and Training

How to utilize the Lee Library's 3D printer. Includes direction on obtaining or designing files for print and the procedures for preparing and sending for print.

Home Finding Existing 3D Objects Software and Training Printing Your Design Printing Policy Showcase

Designing 3D Models

Say you have an idea for a great new bottle opener, or you just sketched a new character for your diorama of the Civil War, or a part broke on your model train and you can't find a replacement. By using some 3D design software, you can render your idea into a 3D model on the computer. If you want to design chess pieces with your family on them, or if you want to custom-build a case for your cell phone, you can do that too!

There are a number of different programs out there and they each offer unique features that may be helpful for you. Some programs are geared towards beginners, while others are more difficult to use, but offer more advanced features. Programs can also differ on their purpose. Some are CAD software that focus on creating precise mechanical drawings, while others are more for creative 3D drawing such as designing action figures or unicorns.

We currently offer Classes in:

1) Printing Preparation:

- Learn how to properly prepare your file to print exactly how you want it. We will go over the entire printing process (design, checks, gcodes, etc) and the limitations of 3d printing. We will be using the software, Meshmixer.

Autodesk Meshmixer

by Tyson James

What is

Autodesk


Meshmixer

Start Prezi

Prezi

3D Printing Prep

Subject Guide



Science/Maps Department

Email Me

Contact:
HBLL Level 2
Provo, UT 84602
801-422-2987

Free Classes

- Sign Up Now!

Online Tutorials

- 3D Printing Ninja
- 3D Printing Ninja Youtube Channel
- Blender Cookie
- Lynda.com (Through Multimedia Lab)
- 123D Design YouTube Channel

Class Powerpoints

- 3D Printing Prep

- Learn basic CAD (Computer Aided Design) skills to create a 3D drawing. In this class, we will create a bicycle, die, fan, and bracelet. We will go over basic tools such as sketches, dimensioning, extrudes, revolutions, lofts, sweeps, fillets, patterns, and assembly.



3) Blender:

- Learn design skills such as modeling, editing, sculpting, rendering, textures, and animation. In these class we will create a mug, iphone case, and sculpt a human head.



4) Adobe:

- Learn to incorporate Illustrator and Photoshop into 3D printing.



- [Adobe](#)
- [Autodesk Meshmixer](#)
- [Autodesk 123D Design: Part 1](#)
- [Autodesk 123D Design: Part 2](#)
- [Blender: Object and Edit Modes](#)
- [Blender: Sculpting](#)
- [Blender: Animation & Physics](#)

Class Files

- [G-code file](#)
- [Blender Background Image](#)
- [Inspector Bunny](#)
- [Slice](#)
- [Non-manifolds](#)
- [3D Printing Curriculum](#)
- [Blender Hotkeys](#)

3D Modeling for Printing Class Survey

- [Blender Survey](#)
- [Autodesk 123D Design](#)

*If you have an FHE group that would like to take a class, please send us an email and we will arrange a private class for your FHE group.

Freeware 3D Design Programs

Here is a list of some FREE common software used in 3D design:

- [Autodesk 123D](#) ⓘ
- [Autodesk Inventor](#) ⓘ
- [Blender](#) ⓘ
- [Meshmixer](#) ⓘ
- [Autodesk 123D Catch](#) ⓘ

Software for Purchase

Here is a list of common software used in 3D design available for purchase:

- [Solidworks](#) ⓘ
- [CATIA](#) ⓘ
- [NX](#) ⓘ
- [Zbrush](#) ⓘ

Print Preparation Programs

To ensure a quality print, it is a good idea to check your model for any errors. These programs will help you find and fix them before you bring it to us.

- [Autodesk Meshmixer](#) ⓘ
- [gCode Viewer](#) ⓘ
- [netfabb](#) ⓘ
- [Autodesk Print Utility](#) ⓘ

Last Updated: Jul 13, 2015 6:08 PM | URL: <http://guides.lib.byu.edu/3Dprinting> | [Print Page](#)

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Tags: 3-d printing, 3d printer, 3d printing, additive manufacturing, rapid prototyping

learn more & RSVP at library.georgetown.edu/events

3D PRINTING DEMONSTRATIONS FOR FACULTY

Math & Science: February 24, 351 Regents Hall

Humanities & Social Sciences: March 3, McGhee Library, ICC

Business & Economics: March 17, 360 Hariri Building

International Affairs: March 24, McGhee Library, ICC

all sessions are 2 PM-3:30 PM ◇ **open to all interested faculty**



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PRINTING TIPS & TRICKS

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GENERAL TIPS & TRICKS

8 Tips for 3D printing with Google Sketchup
(from MasterSketchup.com)

3D printing basics
(from 3ders.org)

Preparing a model for 3D printing
(from About.com 3D)

Introduction to dual extrusion on the Makerbot Replicator 2x
(video by Makerbot)

Sketchup: repairing 3D models that display black faces
(from Sketchup Knowledge Center)

SKETCHUP TUTORIALS

10 Sketchup tips every modeler should know
10 important Sketchup features to know about. If you don't have the time or patience to watch video tutorials at least read through this!

Sketchup Learn Center
The home base for guidance on how to use Sketchup, from video tutorials to tips and quick reference guides

Introduction to Sketchup interface
New to Sketchup? Start by familiarizing yourself with the program

(Videos) Getting started with Sketchup

(Videos) Creating shapes in Sketchup

(Videos) Learning the tools on the toolbar

(Video) Using layers in Sketchup

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TINKERCAD TUTORIALS

- [Keyboard shortcuts for the Tinkercad Editor](#)
(from the Tinkercad blog)
- [Tinkercad Quests](#)
Interactive tutorials from Tinkercad to introduce users to the editing tool
- [Heard rumors that Tinkercad was going away?](#)
If you've done searches on Tinkercad you may have seen articles stating that Tinkercad was no longer being developed and would soon disappear completely. Fear not - Autodesk bought Tinkercad! Read on for details.
- [How to 3D print a vector file using Tinkercad](#)
(from instructables.com)

RHINO TIPS & TRICKS

- [Model preparation in Rhino](#)
(from Williamette University) important aspects of your model to review before having it 3D printed

We do not currently have Rhino on our machines in the SMS so unfortunately we are not able to provide much instructional support. However, here are a few resources that may be of use to Rhino users.

- [Rhino - tutorials](#)
(from Rhinoceros)

ONLINE 3D MODELING COMMUNITIES

- [Thingiverse](#)
from Makerbot - a place to share and download free printable 3D model designs
- [Smithsonian X 3D](#)
The Smithsonian is in process of digitizing its collection in 3D and offers free, downloadable model files
- [Sketchfab](#)
Online community for publishing and browsing 3D models - some offer the option to download
- [YouMagine.com](#)
a file-sharing 3D printing community with a built-in web-based 3d modeling tool
- [My Mini Factory](#)
Downloadable 3D models (some free); sign up for a free account to earn free credits toward downloads; upload your own designs to earn more credits (and can even charge for your models)
- [Shapeways](#)
Make, buy and sell 3D printed products
- [Ponoko](#)
Make, share, buy or sell 3D product designs



UM3D LAB
DIGITAL MEDIA COMMONS



Walk Up - Cube 2

[Home](#) » [Cube 2](#)

The UM3D Lab offers a wide range of Additive Manufacturing and 3D Printing technologies to help you create physical versions of your digital creations. We want to provide you the technology and support needed for you to do what you do best, come up with great ideas and novel uses.

As part of our service we have a collection of walk-up Cube 2 printers which give you the opportunity to get your hands dirty and print designs yourself. These printers are currently located in the Duderstadt Center just past the 1st floor info desk. All you need to get started is a material cartridge, an STL file, and registration into the reservation system. Below is a list of tutorials to get started, some helpful links for reserving time on the printers, and generally how to get started.

General hours for support in the UM3D Lab are: **Monday-Friday: 9am-6pm**



3D Printer Cluster

Steps to 3D Printing on the Cube 2:



1. Learn to Operate the Machine

Review the how-to videos below. They're short and show you how to use the printers so your part comes out correctly (and the machine survives the process). You will need this information to pass the knowledge test.

[Watch Cube Tutorial Videos](#)
[Frequently Asked Questions](#)



2. Get Access to the Printers

To be able to reserve the printers we need to know you understand how the printers operate and how to print a part. Take a basic knowledge test showing you understand what's in the videos.

[Take the Knowledge Test](#)



3. Reserve a 3D Printer

Once you've been added to the system (you will receive an email), you can reserve time on a printer through the Event Management System (EMS) reservation system. Once you've reserved a time block you can then get a key from the info desk **during your reserved time**.


[Learning to Reserve Time](#)
[Open the EMS System](#)



4. Print Your Creation

To fabricate your part you will need a **PLA** material cartridge (**NO ABS**), and a USB memory stick containing your Cube file. It may take a couple tries to have a successful print, but once you get the hang of it you will be on your way! Be sure to order **PLA material only** as **ABS is not permitted** on MLibrary Cubes.

[Order Your Own Materials](#)
[Download the Software](#)



5. Final Cleanup

Please return the Cube to the state that you found it in. Remove your part, clean the print plate, toss any waste, return checkout items, and don't forget to take your USB memory stick.

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RESOURCES

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Workshops in this category (16):


- [Getting Started with 3D Printing \(Hunt\)](#)
- [Getting Started with 3D Design](#)
- [Introduction to Arduino and MaKey MaKey](#)
- [Spooky Sounds with Arduino](#)
- [Introduction to Arduino](#)
- [D-I-WISE Workshop](#)
- [D-I-WISE Workshop](#)
- [D.H. Hill Makerspace Orientation](#)
- [Getting Started with 3D Printing \(Hill\)](#)
- [Making Sense of Sensor Data: An Introduction to the Internet of Things](#)
- [CAD 101: Intro to Digital Fabrication with Autodesk Fusion 360](#)
- [CAD 101: Intro to Digital Fabrication with Autodesk Fusion 360](#)
- [Intermediate CAD & 3D Printing: Digital Design Best Practices with Autodesk Fusion 360](#)
- [Intermediate CAD & 3D Printing: Digital Design Best Practices with Autodesk Fusion 360](#)
- [Next-Level CAD: Advanced CAD & 3D Scanning Best Practices](#)
- [Next-Level CAD: Advanced CAD & 3D Scanning Best Practices](#)

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A guide to 3D Printing at Morris Library.

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BOOKS




Fabricated - Hod Lipson; Melba Kurman
 Call Number: Z249.3 .L57 2013x
 ISBN: 9781118350638
 Publication Date: 2013-02-11



3D Printing - Christopher Barnatt
 Call Number: TS171.8 .B37 2013x
 ISBN: 9781484181768
 Publication Date: 2013-05-04



3D Printing for Artists, Designers and Makers - Stephen Hoskins
 Call Number: TS171.4 .H67 2013x
 ISBN: 9781408173794
 Publication Date: 2014-01-02



Makers - Chris Anderson
 Call Number: HB615 .A683 2012x
 ISBN: 9780307720962

TUTORIALS

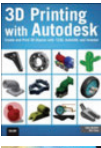
- Autodesk 123D Design Tutorials
- MasterSketchup.com
- Blender Tutorials
- Blender 3D Design Course
- Netfabb Studio Video Tutorials
- Makerbot's OpenSCAD Tutorial

3D PRINTING NEWS

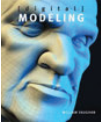
- 3D Printing Will Change Auto Industry, From Manufacturers to Dealers - Ward's Auto
- ORNL & Clayton Homes are 3D Printing a Home & Car That Share Energy with One ... - 3DPrint.com
- 3D printing can revolutionise emergency healthcare - SciDev.Net
- InterLatin Continues Success in 3D Market with Constructor 3D Printing Software - 3DPrint.com
- 3D Printing Dog 'Helps' Creates These One-piece Fully Assembled Kinetic Sculptures - 3DPrint.com

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3D MODELING BOOKS



3D Printing with Autodesk - John Biehler; Bill Fane
 Call Number: TS171.8 .B54 2014
 ISBN: 9780789753281
 Publication Date: 2014-05-14



Digital Modeling - George Maestri; William Vaughan
 Call Number: T385 .V38 2012x
 ISBN: 9780321700896
 Publication Date: 2011-12-23



Beginner Blender - Lance Flavell
 ISBN: 9781430231271
 Publication Date: 2010-01-01

3D PRINTING BLOGS

- 3D Printing Industry
- 3DPrint
- Makerbot Blog
- Fabbaloo
- 3ders
- Makerhome

OBJECT REPOSITORIES / COMMUNITIES

- Thingiverse**
 Thingiverse is a community to discover, make, and share 3D models. Users can download files of objects that others have made. Several of the objects can be customized and modified.
- Yeggi**
 Yeggi is a search engine to find 3D printable objects.
- Reprables**
 Open repository of digital files suitable for 3D printing.
- Sketchup 3D Warehouse**
 Sketchup's design library of 3D models.
- Smithsonian X3D**
 Collection of 3D models of various artifacts from the Smithsonian Museums.
- NIH 3D Print Exchange**
 Search, browse, download, and share 3D biomedical printable models including custom labware.
- NASA 3D Resources (Beta)**
 NASA's 3D resources site that includes several printable models in .STL

Publication Date: 2014-04-08



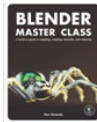
Printing Things - Claire Warnier; Dries Verbruggen; S. Ehmann (Editor); R. Klanten (Editor)

Call Number: TS171.8 .P75 2014x
ISBN: 9783899555165
Publication Date: 2014-05-22



Make: 3D Printing - Anna Kaziunas France (Editor)

ISBN: 9781457182938
Publication Date: 2013-12-13



Blender Master Class - Ben Simonds

ISBN: 9781593274771
Publication Date: 2013-03-03



Autodesk Inventor 2014 and Inventor LT 2014 - Thom Tremblay

Call Number: T385 .T74 2013x
ISBN: 9781118575208
Publication Date: 2013-07-22

format.

- **British Geological Survey**
Site contains many 3D models of fossils. You can download an OBJ file to use in 3D printing.
- **AfricanFossils.org**
Africanfossils.org has several 3D models of significant fossils and artifacts in categories such as hominids, animals, and tools. It is a partnership with Autodesk, National Geographic, the Turkana Basin Institute, the National Museum of Kenya, and Stony Brook University.
- **The Collection - Art & Archaeology Museum**
3D Scan project by artist Oliver Laric at The Usher Gallery at The Collection in Lincolnshire, UK.
- **The Virtual Hampson Museum**
3D scans of Native American artifacts from the Hampson Archeological Museum State Park in Wilson, Arkansas. OBJ files are included.

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3D Printing @ Gerstein + MADLab

Everything you need to know about the Gerstein Science Information Centre's 3D printer in the MADLab

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[How To... Prepare your Design File](#)

[How To... Use the Digitizer 3D Scanner](#)

[How To... Learn about Next Level 3D Printing](#)

[How To... Learn more about 3D Printing Design Elements](#)

[How to... Change the World with 3D Printing](#)

[Think Critically about Making](#)

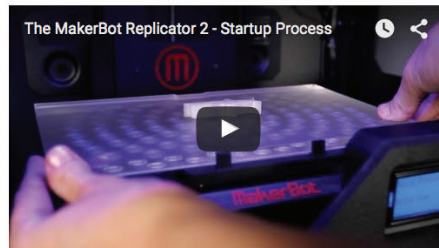
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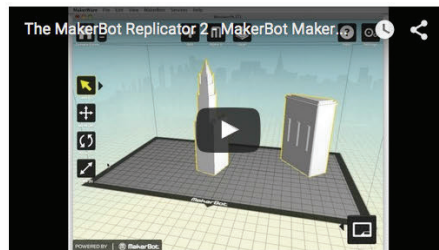
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How To... Level the Build Plate



How To... Prepare your Design File



How To... Use the Digitizer 3D Scanner

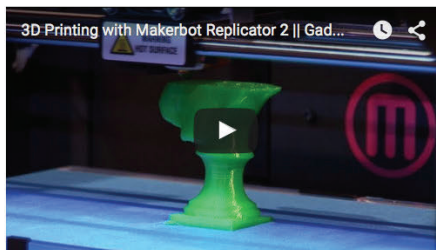


How To... Learn about Next Level 3D Printing

Watch Toronto's resident 3D Printing expert, Derek Quenneville, show off objects and design elements created by 3D printers more powerful than our own Makerbot Replicator 2s.



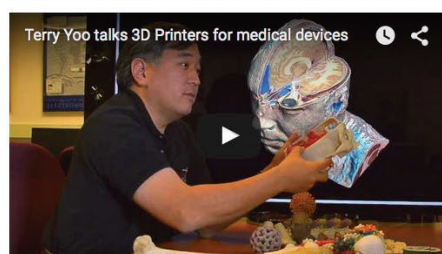
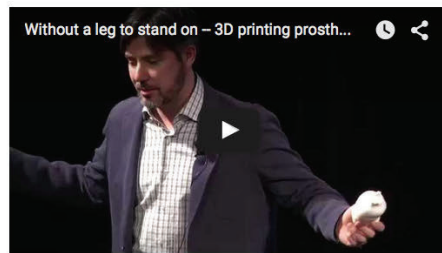
How To... Learn more about 3D Printing Design Elements



How to... Change the World with 3D Printing

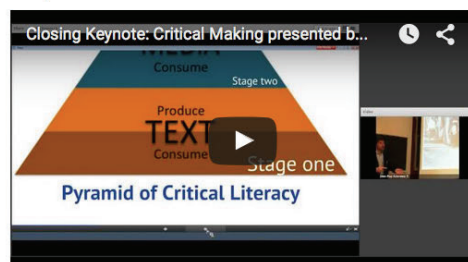
Watch the inspiring videos below to see how 3D printing is changing lives with patience, spirit, and a desktop 3D printer.





Think Critically about Making

How can higher education productively contribute to the move from users to makers? What systems, methods, understandings are necessary for us to play an active role? And why should higher education participate in these developments?



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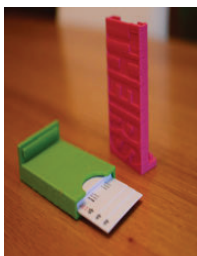
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Featured Print



Want to up your networking game and show off your 3D printing skills? Organize your business cards and collected cards with these [dual card holders](#) on [Thingiverse](#). More job-hunting designs [on the blog!](#)

3D Printing Collection @ The MADLab



Getting Started with MakerBot by Bre Pettis; Anna Kaziunas France; Jay Shergill
ISBN: 1449338658



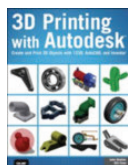
Makers: The new industrial revolution by Chris Anderson



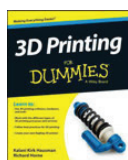
Makers by Cory Doctorow



Fabricated by Hod Lipson; Melba Kurman



3D Printing with Autodesk by John Biehler; Bill Fane



3D Printing for Dummies by Kalani Kirk Hausman; Richard Horne



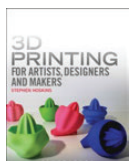
Make: Ultimate Guide to 3D Printing 2014 by Mark Frauenfelder (Editor)



DIY Citizenship by Matt Ratto (Editor); Megan Boler (Editor)



More 3D Printing Resources at UTL



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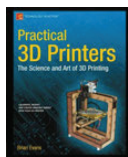
**Printing for Artists,
Designers and
Makers** by Stephen
Hoskins



**Beginning Google
Sketchup for 3D
Printing** by Sandeep
Singh



**Mastering AutoCAD
for Mac** by George
Omura; Richard (Rick)
Graham



Practical 3D Printers
by Brian Evans



The

3D Printing & Making Websites

- [Adafruit Industries](#)
Tutorials, community forums, and an online shop for makers and 3D printers. Also view their extensive YouTube channel!
- [Instructables 123D group](#)
Instructions for designing creative prints using Autodesk 123D Design.
- [MAKE Magazine](#)
Online resources for videos, how-tos, blog posts, and more on a wide range of maker projects.
- [MakerSpace](#)
MAKE Magazine's online community for makers.
- [Shapeways](#)
Sell 3D printed products in Shapeways' online marketplace.
- [The Art of 3D Print Failure Flickr Group](#)
A community for sharing epic fails and learning from mistakes.
- [YouMagazine](#)
An online community of 3D print enthusiasts and tinkerers for sharing ideas.

3D Printing & Making Blogs

- [3D Printing Industry](#)
News and reports on new developments in 3D printing.
- [3Digital Cooks](#)
A blog all about experimental 3D food printing.
- [James Madison University 3-SPACE](#)
JMU students in 3D printing courses blog about what they've learned and applications of 3D printing in their future careers.
- [Law in the Making](#)
The 3D printing law blog. All about copyright, patents and other legal issues.
- [MakerBot Blog](#)
The company's blog featuring tips, updates, and cool projects.
- [RepRap Magazine](#)
Free online magazine including reviews, interviews, and news about 3D printing.
- [Tales of a 3D Printer](#)
A middle school Maker Club blogs about their adventures in 3D printing.
- [Textile Messages](#)
Blog of The Creativity Labs at Indiana University Bloomington. Posts on wearable tech, maker culture, and learning and technology.



Toronto 3D Printing Services & Maker Communities

- [University of Toronto Faculty of Applied Science & Engineering - Entrepreneurship Hatchery 3D Printing Service](#)

After you apply for the 3D printing service and submit your STL file, one of the Hatchery connectors will contact you about all the specifics we need to know for the printing.

- [3D Hubs in Toronto](#)

Find makers in your community who will print your designs for a fee.

- [3Dphacktory](#)

A full-service 3D printing and design studio located downtown.

- [Critical Making Lab](#)

Website of the University of Toronto's Critical Making Lab, including workshops and info about their projects.

- [Hacklab.to](#)

A collective of computer programmers, web designers, and hardware hackers. The group runs a blog and meets on Tuesday nights.

- [Hot Pop Factory](#)

A 3D design and printing studio, offering printing services and consultations for client projects.

- [MakeLab](#)

A manufacturing studio for makers and businesses. Also run classes and events.

- [MakerKids](#)

Programs for kids and training for adults in their Dundas West makerspace.

- [Toronto MakerFaire](#)

A two-day festival for makers to show off and share their projects and expertise.



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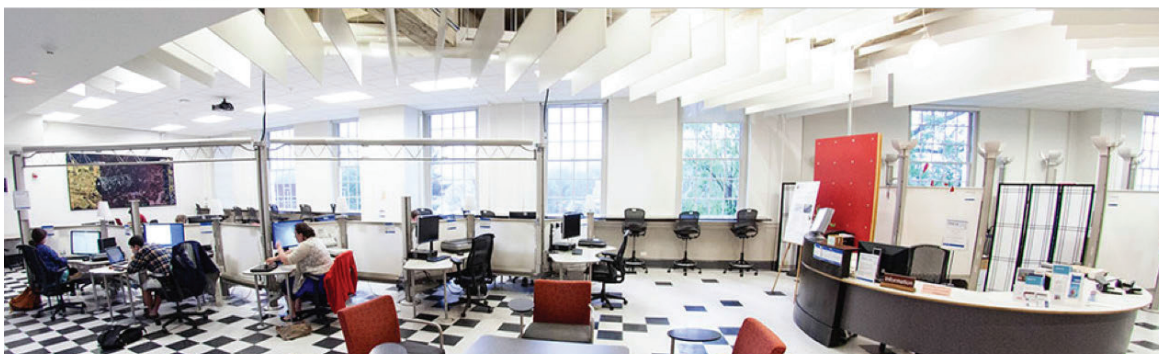
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SCHOLARS' LAB

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Spring 2015 Makerspace Workshops

By Laura Miller · January 21, 2015

Introduction to Omeka

Wednesday, January 28

10:00 am–11:30 am · Alderman Library, Room 421

[Omeka](#) is a simple, free, web publishing system developed at the [Roy Rosenzweig Center for History and New Media](#) at George Mason University. It was specifically built to enable scholars, archives, libraries, museums, and independent researchers to create online exhibits of their work without having to know HTML or CSS. If you have a collections of digital resources that you want to show in a scholarly way, Omeka could be a great tool to have in your toolkit.

Instructor: [Ronda Grizzle](#)



Introduction to 3D Printing

Thursday, January 29

2:00 pm–3:30 pm · Alderman Library, Room 421

This workshop will introduce participants to the exciting world of desktop fabrication. We'll provide a brief overview of current trends and tools for 3D modeling and printing. We'll also go over the basics of model creation with photogrammetry, and discuss how 3D printing works, including a live demonstration with one of our Makerbots.

Instructor: [Jeremy Boggs](#)



Working with Arduino I

Thursday, February 5

2:00 pm–3:30 pm · Alderman Library, Room 421

Do you want to hack your personal items with switches or sensors? [Arduino](#) is a tool for making microcomputers that can sense and control the physical world. This workshop will introduce participants to the basics of physical computing programming through a series of hands-on exercises using our Arduino kits. No electronics experience required!

Instructor: [Jeremy Boggs](#)



Introduction to Neatline

Wednesday, February 11

10:00 am – 11:30 am · Alderman Library, Room 421

Using [Neatline](#), anyone can create beautiful, interactive maps, timelines, and narrative sequences from collections of archives and artifacts, telling scholarly stories in a whole new way. Join us for this hands-on introduction. See <http://neatline.org/> for more information.

Instructor: [Ronda Grizzle](#)



Working with Arduino II

Thursday, February 12

2:00 pm–3:30 pm · Alderman Library, Room 421

New to microcontrollers? Or used an Arduino before and want more time to play in a supportive environment? Come on by! [Arduino](#) is a tool for making microcomputers that can sense and control the physical world. This workshop will introduce participants to the basics of physical computing and programming through a series of hands-on exercises using our Arduino kits. This workshop builds on the Working with Arduino I workshop, but it's not required to attend this one.

Instructor: [Jeremy Boggs](#)



HTML for Beginners

Thursday, February 19

2:00-3:30 pm · Alderman Library, Room 421

Wonder how websites work? Want to get started creating web content of your own, but have no idea how to do that? This is the class for you. We'll cover everything from how URLs work to basic HTML coding skills to general netiquette. This workshop is intended for absolute beginners with no knowledge of HTML.

Instructor: [Ronda Grizzle](#)

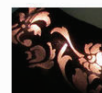
Intro to Wearables and Soft Circuits

Wednesday, February 25 [THIS EVENT HAS BEEN RESCHEDULED FOR **MARCH 18 at 10:00 AM**]

10:00-11:30 am · Alderman Library, Room 421

Have ideas to make your life simpler with hacks for your outerwear or accessories? This beginner workshop will introduce the basics of circuitry and give an overview of current trends in wearable computing. Participants will make their own circuit using LED's and conductive thread. Materials will be provided and no experience with sewing or electronics is necessary.

Instructors: [Jeremy Boggs](#) and [Purdom Lindblad](#)



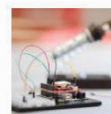
Working with Arduino III

Thursday, February 26

2:00 pm-3:30 pm · Alderman Library, Room 421

New to microcontrollers? Or used an Arduino before and want more time to play in a supportive environment? Come on by! [Arduino](#) is a tool for making microcomputers that can sense and control the physical world. This workshop will introduce participants to the basics of physical computing and programming through a series of hands-on exercises using our Arduino kits. This workshop builds on the Working with Arduino I and II workshops, but they're not required to attend this one.

Instructor: [Jeremy Boggs](#)



Introduction to 3D Printing

Thursday, March 5

2:00 pm-3:30 pm · Alderman Library, Room 421

This workshop will introduce participants to the exciting world of desktop fabrication. We'll provide a brief overview of current trends and tools for 3D modeling and printing. We'll also go over the basics of model creation with photogrammetry, and discuss how 3D printing works, including a live demonstration with one of our Makerbots. This course is a repeat of the Jan. 29 session.

Instructor: [Shane Lin](#)



Scholars' Lab workshops assume attendees have no previous experience. They will be hands-on with with expert assistance. All are free to attend, and they are open to the UVa and larger Charlottesville community.