COLLEGE of SOUTHERN MARYLAND
MAKERSPACE
at the VELOCITY CENTER

Member Handbook

Makers, Builders and Innovators - Welcome to the Ultimate Playground!

Getting Started

What can I do at the Makerspace at CSM's Velocity Center? You can:

- Reserve tools or space
- Take a class.
- Teach a class.
- Use open lab for personal projects

Location and Hours of Availability

4465 Indian Head Highway, Indian Head, MD 20640 (inside the CSM Velocity Center).

Monday, 9:00 AM to 6:00 PM, appointment only,

Tuesday through Friday, 9:00 AM to 11:59 AM, appointment only

Tuesday through Friday, 12:00 PM to 6:00 PM, open lab hours

These hours are subject to change. For the most up-to-date hours of operation visit our website at www.csmd.edu/makerspace or contact us at makerspace@csmd.edu or 301-539-4380.

Membership

As a member you will have access to our 1,984 square foot lab space and fabrication tools and equipment for your use. Membership is required to schedule and use the tools at the Makerspace at the CSM Velocity Center. Many tools require training classes or safety checkouts. Membership is not required to take a class or participate in public events at the space.

Becoming a Member

1. Start by enrolling in our **Equipment and Safety: Introduction to Makerspaces** class, which includes your first month of membership.
   CSM Students Get Free Membership
   Current CSM students can take the **Equipment and Safety: Basic Makerspace Training for Current CSM Students** class at no cost to become a member. Current CSM faculty/staff can access training in their **NEOED** dashboard and take the **CSM Makerspace Safety Course**.
2. You must complete all safety related quizzes with a score of 100%. You can take the safety test as many times as needed for a passing score.
3. Once you receive a passing score on the safety test, email makerspace@csmd.edu for further guidance.
4. All members will be required to submit a **Member Agreement and Waiver of Liability form**.

Open Lab

During the open lab hours members can work on their projects. Open hours are self-guided, and members are working independently. To participate in open hours, members must have completed all steps to become a member and have a paid membership.

Reserving Time on Equipment

Visit our website at https://www.csmd.edu/makerspace to reserve certain pieces of equipment.

Signing Up for Classes

Classes can be found at https://csmd.augusoft.net/info/landing/Makerspace. We also advertise our classes on social media.

Entry and General Use

1. A **Liability Waiver** must be completed and on file. For Children under 18 a parent or legal guardian must complete the **Liability Waiver**.
2. Upon entry, all makerspace members and guests should sign in at the Kiosk computer.
3. Makerspace equipment should be used in a manner consistent with the proper use of each device. Equipment should not be mishandled or used in a way that can cause damage. Staff have the right to end the use of equipment if deemed necessary.
4. Food and drinks may only be consumed outside of the makerspace.
5. Observe good housekeeping practices. Work areas must be always kept clean and tidy.

Safety

Safety is important at the Makerspace at CSM's Velocity Center. We implement a variety of safety measures and safety guidelines for using equipment and working in the Makerspace, which if followed, result in the safe enjoyment of the facilities. It is of the utmost importance that members follow the safety guidelines and policies, including those covered in the required safety and orientation session.

Members must recertify their qualifications every year.

The most current health safety measures can be found at CSMReady https://www.csmd.edu/ready/covid-19/index.html

Basic Safety

- Know the locations and operating procedures for all safety equipment including first aid kit, eye-wash station, and fire extinguisher.
- Know where the fire alarm and exits are located.
- Give your work and the tool you are using your undivided attention.
- Follow the instructions for the tool you are using and operate the tool according to its manufacturer's safety regulations
- Pay attention to the tool while it is running (i.e., do not walk away from the laser when in
- operation).
- Operate tools and machines with a clear mind (never under the influence of drugs, alcohol, or when fatigued).
- Operate equipment in a manner consistent with the proper use of each device. Equipment should not be mishandled or used in a way that can cause damage. Staff have the right to end the use of equipment if deemed necessary.
- Repairs, modifications, and/or tampering with equipment outside of normal operating parameters is prohibited by patrons.
- Headphones are prohibited if it prevents you from remaining aware of their environment. Do not plug in anything into an outlet group where at least one outlet is being used for makerspace equipment.
- Notify a staff member immediately of any unsafe conditions you observe.

Wear safe attire:

- Closed toed shoes.
- Wear proper Personal Protective Equipment (PPE) when using or around equipment, including earmuffs, goggles, and masks. Use only proper PPE for the equipment you are using. For example, use a dust mask and not a T-Shirt.
- Tie back long hair.
- No loose clothing.
- Remove loose jewelry, necklaces, hoodie strings, and non-essential gloves when using power tools. This includes watches of any kind including smart watches.
- No wired headphones. These can get caught on tools.

Ask for help:

- If you have a problem with a machine or operation.
- When handling long, large, or heavy materials.
- Anytime you feel unsure especially about the safety of what you are about to do.
- Seek first aid help immediately for any injury.

Shared Safety

Be respectful – the Makerspace is a community. What you do will affect others.

- Avoid startling people who are focused on their project and using potentially dangerous tools.
- Do not tap people on the shoulder.
- Move into others' line of sight before attempting to attract their attention.
- Give warning before making sudden loud noises.
- If a person is doing something dangerous, you notify a staff member first unless their actions are within your immediate presence and would hurt you.
- Notify any staff member of broken or damaged tools. Broken tools from regular usage are not the financial responsibility of the patron.
- Respect all members, staff, faculty, and guests.
- Return tools to their proper place so that they are readily available for all to use.
- Sweep, vacuum, and wipe off your workspace as appropriate when finished.
- Do not leave projects on workspace surfaces.
- Storage space may be available for a small fee, but space is limited.
- Take all your scraps and trash out to the dumpster on your way out.

Unsafe Materials

Do not bring toxic materials to the makerspace. The following materials are not allowed:

- Lead materials, for example, lead paint, solder, sheets, and ingots.
- Flammable explosives
- Radioactive materials
- Paint of any kind
- Use only the approved materials for the laser (see acceptable materials list).
- Disposal of electronic, corrosive, or other hazardous material provided by makerspace staff must be disposed of by makerspace staff.
- Disposal of approved electronic, corrosive, or other hazardous materials (such as batteries, PCBs, light bulbs) must be recycled by the user.
- This list is not comprehensive. If usage of the material begins to affect other people, then we will ban this material.

Equipment and Tools

The Makerspace at CSM's Velocity Center has equipment tools that can be used while working in the space. Usage is included in your membership.

Equipment Use Guidelines

1. Equipment may be used only for lawful purposes. The patrons will not be permitted to use equipment to create material that is:
    - Prohibited by local, state or federal law.
    - Unsafe, harmful, dangerous or poses an immediate threat to the well-being of others.
    - Obscene or otherwise inappropriate for the Makerspace environment, including weapons.
    - In violation of another's intellectual property rights. For example, equipment may not be used to reproduce material that is subject to copyright, patent or trademark protection.
2. Saws cannot be used in the makerspace.
    a. Due to the ventilation requirements of various electronic equipment, saws are not allowed in the makerspace. Sandpaper is

allowed but only light, hand powered sandpaper. You must be away from all electronics.

3. Please consult staff about materials not available or requests to use your own materials for makerspace equipment.
4. A staff member will be present during operational hours to supervise the use of equipment and manage the order of work being produced. Staff will have the final say when determining the order of jobs when there are multiple jobs in the queue.
5. All hand tools need to be returned to their designated home after use.
6. When using knives and other sharp instruments, always carry them with tips and points pointing down and away.
7. When handing off a tool to another person, turn off the tool, make sure that any safety mechanisms are in place, orient any sharp components/parts/points away from both you and the recipient, place the tool on the table, and have the other person pick it up.
8. Never try to catch falling sharp instruments. Grasp sharp instruments only by the handles.
9. If you have a medical condition (e.g., allergies, pregnancy, etc.), check with your physician prior to working in the makerspace.
10. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to a staff member immediately, no matter how trivial it may appear.
11. Never leave machines unattended.
12. Never try to stop a machine with your hands or other body parts.
13. It is recommended that you wash your hands after using the makerspace to remove any debris.

Supplies

Members may bring their own materials for the laser cutter and CNC router (see acceptable materials list) for materials that the makerspace does not have on hand.

We provide 3D printer filament for a fee. *We do not allow outside filament for the health of our machines.

*Some exceptions may apply. Contact makerspace@csmd.edu for inquiries.

Equipment/Tool Training and Assistance

Note: you may only use equipment you are trained to use.

Initial membership requires basic operation and safety training for all members. We have tried to cover the safety and basic operation in our **Equipment and Safety: Introduction to Makerspaces** class. However, if you ever feel unsure or think something is wrong, stop what you are doing and ask any staff member. We are here to assist you.

Please ask for help when you run into problems with our tools and equipment. Subject to our regular duties, knowledge, and experience, we will try our best. We may need to refer you to other resources.

Keep in mind that the Makerspace at the CSM Velocity Center provides access to the tools and equipment while you, the maker, provides the design skills to make your actual items. If you need more than 10-15 minutes to solve your design or project problem, you should inquire about signing up for a class to improve your skills.

Equipment

3D Printers

- 3D model designs must be one of the following file formats: STL, OBJ, DAE, or 3MF.
- No incompatible filament is allowed to be used in the 3D printers.
- 3D prints that are not picked up within 7 days of notification, will be subject to a storage fee and discarded after 14 days. Items must be picked up by the individual who printed them.
- Digital designs are also available from various file-sharing databases such as thingiverse.com. You can print or modify designs that are not protected by copyright.
- Staff are not responsible for knowing whether an object is protected by copyright.

Laser Cutter & CNC Router (Available to members with training course)

The laser cutter uses a high-powered and precise laser to cut or engrave a wide variety of materials including wood, acrylic, glass and more (see acceptable materials). The CNC Router with its large capacity is ideal for cutting a range of resistant materials such as hard and soft wood, plastic, modelling foam, acrylic and prototyping material.

1. The Makerspace will supply limited amounts and types of materials for the laser cutter.
2. A small number of materials will be available for purchase. Otherwise, users must supply their own materials upon prior approval by Makerspace staff.
3. Please consult with Makerspace staff about materials not available or requests to use your own materials.
4. Files for the laser cutter can be created using vector graphic programs.

For a list of acceptable and banned materials, visit the following link or view the Appendix at the end of this handbook:

https://www.csmd.edu/about/locations/velocity-center/acceptable-materials.pdf

Vinyl Printer/Cutter (Available to members with training course)

The vinyl printer/cutter is used to create vinyl prints for stickers, posters, and even T-shirts and other garments. Members have access to various vinyl options stocked at the makerspace. If personal vinyl is to be used, contact us at makerspace@csmd.edu for compatibility checks.

3D Scanner (Available to members with training, but training is limited at this time.)

The 3D Hand Scanner uses a laser mesh to scan and convert objects into 3D rendered files. These files can be used for animations, 3D prints, and more.

- Personal Protective Equipment (PPE) for the 3D Scanner includes laser-safe goggles. This is due to the laser mesh. The laser is safe to look at generally but should not be pointed directly into someone's eyes. For this reason, all other members and staff in the space must be wearing laser-safe goggles when the scanner is in use.

Media & Visual Equipment (Available for use by request)

The Makerspace is equipped with two professional-grade, video cameras (BlackMagic Pocket Cinema Camera 6K Pro), two accompanying tripods, and a Tricaster Mini for production. All items are configured on our media cart. Staff can assist with the setup and teardown of media equipment, but the user will primarily use the software and camera features on their own.

Sewing Machines (Training unavailable currently)

The Makerspace is equipped with a Brother 1634DX Thread Serger sewing machine and a Brother LX3817G Mechanical sewing machine. Because staff is not yet trained on these devices, usage of these machines is limited, and training is not yet available. Members may request to use these machines if they can provide proof of competency with thread serger or mechanical sewing machines.

Soldering, Desoldering, and Heat Guns (Available to members with brief training, or prior course enrollment)

Soldering and desoldering equipment is available for use as well as heat guns. Members may use this equipment after receiving a brief training on proper usage of the machines OR after taking a course involving soldering at the Makerspace.

- Personal Protective Equipment (PPE) for the soldering equipment includes safety goggles. A carbon filter fume extractor must also be set up to prevent the inhalation of soldering fumes.

Computers and Software

Appropriate use/Policies

- You may log into Makerspace devices using your my.CSMD login credentials. This creates a profile for you on the device. It is not recommended that you leave data stored on the Makerspace devices unless you have access to OneDrive, as there is no guarantee you will be able to retrieve your files otherwise.
- Email files to yourself so they can be easily accessed at the Makerspace at CSM's Velocity Center.
- Personal USB drives are not permitted. If you need to request a USB drive, speak with the Makerspace coordinator and one can be issued to you in exchange for a reasonable collateral item. Collateral items will be returned with the return of the USB drive.
- Some software may only be available on one or two computers. Please ask staff to identify computers with these types of software.
- The Makerspace laptops and desktops will provide you with access to the following software for use with the equipment. Video tutorials can be helpful when needed.

Stratasys F370 3D Printer:

- GrabCAD Print

MakerBot Method X, Sketch, and Rep+ 3D Printers:

- Ultimaker Cura

FormLabs 3B & 3B+:

- Preform

Denford CNC Machine:

- Denford VR Milling V5

- Autodesk Fusion (by request)
- Denford Quick CAM 2D w/ VCarve:
- Denford QuickCAM Pro:
- Vectric VCarve:

Pocket NC V2-50 CHB:

- Autodesk Fusion (by request)
- Kinetic Control Software

Creaform HandySCAN 700 3D Scanner:

- VXElements

Roland BN-20A:

- Versaworks7

Universal Laser Systems (ULS) R5000 Laser Cutter:

- ULS Laser System Manager

Digital Design Software:

- Inkscape
- Krita
- Scribus
- Adobe Creative Cloud – including Adobe Illustrator (available to those with a pre-existing subscription)
- Blender
- Autodesk Fusion (by request)
- FreeCAD
- KiCAD

Software Development Tools:

- Arduino IDE
- Visual Studio Code
- VEXcode V5

Materials

Fees

- Members pay for materials used. Pricing is based on PaperCut quotes.
- Pricing and material availability are subject to change.
- We use a **no cash** payment system. Materials and jobs can be purchased/paid for online using our electronic payment site, Touchnet:
  - https://secure.touchnet.net/C20376_ustores/web/store_main.jsp?STOREID=5&SINGLESTORE=true
- Makerspace staff reserves the right to accept or reject projects.

Papercut Instructions

We use PaperCut for managing 3D prints, Vinyl Printing, Button Making, Color Printing, Laser Cutting, CNC Routing, and other jobs.

You can log into PaperCut using your my.CSMD login credentials. You will have set up your my.CSMD login credentials when taking an Equipment and Safety membership course on MyLearning.

To access Job Ticketing, go to the following link:

https://pc.csmd.edu/user

You can also access PaperCut from the link under the “Project Requests” tab on our webpage:

https://www.csmd.edu/makerspace

All applicable projects can be requested/quoted through PaperCut. Contact makerspace@csmd.edu or 301-539-4382 with any questions.

Appendix

3D Printer Specifications

MakerBot Sketch (available for classes)

Quantity: 8
Printing Bed Size: 5.9 x 5.9 x 5.9 inches
Filament Types: PLA
Dissolvable Supports: No
Website link to manufacturer: https://www.makerbot.com/3d-printers/sketch-standard

MakerBot Method X (submit print request)

Quantity: 2
Printing Bed Size (Dual Extruder Setup): 6.0 x 7.5 x 7.75 in
Filament Types: PLA, ABS, Tough
Dissolvable Supports: Yes
Website link to manufacturer: https://www.makerbot.com/3d-printers/method

MakerBot Replicator+ (submit print request)

Quantity: 4
Printing Bed Size: 11.6 x 7.6 x 6.5 in
Filament Types: PLA and ABS
Dissolvable Supports: No
Website link to manufacturer: https://www.makerbot.com/3d-printers/replicator/

Stratasys F370 (submit print request)

Quantity: 1
Printing Bed Size: 14 x 10 x 14 in
Filament Types: ABS, PLA, ASA

Dissolvable Supports: Yes
Website link to manufacturer: https://www.stratasys.com/3d-printers/f123-series

Laser Cutter Specifications

Universal Laser System VLS R50000 - Large Laser (direct use)

Quantity: 1
Printing Bed Size: 32” x 34”
Acceptable Materials: see acceptable materials
Website link to manufacturer: https://www.ulsinc.com/products/platforms/ultra-r5000

Glowforge Plus - Tabletop Laser (wireless use)

Quantity: 1
Printing Bed Size: 11” x 19.5”
Acceptable Materials: see acceptable materials
Website link to manufacturer: https://shop.glowforge.com/products/glowforge-plus

CNC Router Specifications

Denford 2600 Pro (direct use)

Quantity: 1
Routing Bed Size: 27.56” x 17”
Acceptable Materials: see acceptable materials
Website link to manufacturer: https://denford.co.uk/products/router-2600-pro

Penta Machine Co. Pocket NC V2-50CHK (direct or wireless use)

Quantity: 1
Routing Bed Size: N/A
Max Travel: 4.55 in – X-axis, 5.05 in – Y-axis, 3.55 in – Z-axis
Acceptable Materials: see acceptable materials
Website link to manufacturer: https://www.pentamachine.com/all-products/p/pocket-nc-v2-50chb-or-chk

Unapproved and Banned Materials – Laser Cutter

Material	Rationale
Construction Grade wood, Treated Wood, construction lumber from your local hardware store, plywood	These types of wood might have been treated with arsenic or other chemicals that when they combust, will emit poison, specifically arsine or formaldehyde gas. Ask before you buy from a store.
Wood with the intention of using it for storing food	For your own safety, don't use the laser cutter with the intent of using the wood for food. The laser cutter is a shared piece of equipment. Porous wood especially.
Wood from furniture	We do not know what the furniture was treated with. For the safety of members, please do not laser unknown materials.
MDF - Medium Density Fiberboard	MDF is often too dense or contains unsafe glue. If the manufacturer states that their specific MDF material is a laser safe, then you will be allowed to use it. You may be asked to confirm.
Polycarbonate (Vinyl fabric, imitation leather for example)	Will emit toxic gas and fumes. Material datasheets are not specific to what gas or fume is emitted but it is not good.
Foam or Styrofoam	Will emit styrene gas when burned.
PVC	Polyvinyl chloride (PVC) is just vinyl, but we would like to make sure to clarify.

Material	Rationale
Anything containing Vinyl or has the word Vinyl in the name	Will release toxic fumes such as *hydrogen chloride and phosgene*
Rubber	Will release toxic fumes
Toxic natural woods	Though it is highly unlikely you would pick up wood that is dangerous, we want to make sure that you should always research if the wood is laser safe.
Plastics other than Acrylic	We are only sure about acrylic.
Any highly reflective materials	Nothing containing mylar, mirrors, polished aluminum, etc. Reflecting an invisible and powerful laser away from its intended target is not a good thing.

Approved Materials – Laser Cutter

Material	Raster (etch) or Cut	Notes
Untreated Natural woods that are considered non-toxic	Both. Cut up to 1/4 in thick	
Untreated plywood or construction wood	Both. Cut up to 1/4 in thick	Be sure to ask for a material safety datasheet or something in writing that says the material is laser safe.
Cork	Etch only	
Acrylic	Both. Cut up to 1/4 in thick	
Metals	Raster only	Possible with non-toxic coating (powder coated paint is non-toxic), laser marking spray, or anodized metals
Polyethylene Foam	Both. Cut up to 1 in thick	
Stone	Raster only	Low power due to chance of cracking. Ensure that the stone is COMPLETELY DRY or the material will explode.
Glass	Raster only	Low power due to chance of cracking.
Paper / Cardboard	Both.	Low power only. High chance of combustion.

Other than proper application of water, masking tape, or a borax water solution, do not pre-treat any materials unless you ask first.

If you are unsure about the material, ask a staff member. A piece of material can be approved for future use as we do want to expand our services. We just want to make sure that we properly follow all safety precautions first. If you find a material online that says laser safe, but it is under the banned category (for example, MDF), we might allow you to use it under supervision.

When asking staff for approval, please show a staff member the product listing on a website. Do not purchase a product beforehand as it may or may not be approved.

No reclaimed or “found on the side of the road” materials allowed. Painted and stained wood is considered treated wood.

Please note that while we understand that our ventilator will suck up most irritants and dangers, this is still a learning environment. We want to make sure that you understand the dangers of combustible materials as affordable laser cutters do not have safety features included.

If you need a supplier, you can try Makerstock. Or just look for any product on Amazon that says, “Laser safe,” “For laser engraving”, or “For laser cutting.”

Approved Materials – CNC Router

Material	Notes
Untreated Natural woods that are considered non-toxic	
Most plywood or construction wood	MDF or Medium Density Fiberboard will create excess dust. Mask required.
Acrylic	
Metals – Non-ferrous only with non-toxic coating	Ask a staff member first for guidance. Requires proper training.

All materials must have a flat base and can be secured on the bed. No irregularly shaped materials such as branches.

Everything else is banned or considered unapproved. Harder metals, such as steel, are too strong for the CNC mill. Other materials may pose a safety risk. If you are unsure about the material, ask a staff member. A piece of material can be approved for future use as we do want to expand our services. We just want to make sure that we properly follow all safety precautions first.

When asking staff for approval, please show a staff member the product listing on a website. Do not purchase a product beforehand as it may or may not be approved.