Metals Studio & Policies

A111 and A111D – High hazard studio
Studio Manager: Vicky Rodriguez – victoria.rodriguez@tufts.edu -
Office in A111 - Hours posted on office door; vary per semester

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Overview

The SMFA Metals Studio has the capabilities for students to work with a variety of processes using non-ferrous metals such as copper, brass, bronze pewter, silver, and gold. Although the majority of work made in Metals is small-scale wearable sculpture, students can create anything from decorative enameled pieces to functional tableware to abstract and figurative sculpture.

Capabilities, Equipment, Materials

Processes & Tools

Space
- 14 individual jeweler's benches outfitted with magnifying lamps
- Four Foredom Flex Shafts
- Separate ventilated areas for soldering, enameling, and casting

Hand tools
- Tool kits including basics: saw frames, pliers, files, measurement and marking tools
- Wax working kits
- Over 140 hammers and mallets
- Chasing and repoussé tools
- Stone-setting and embossing
- General use and specialty pliers
- Dapping blocks and punches

Cutting
- Jump shear
- Beverly shear
- Disc cutter
- Band saw

Hot processes
- 3 natural gas/oxygen soldering stations
- 2 mobile Smith Little Torches
- Casting torch and melting dishes
- 2 PMC kilns

Casting
- Vulcanizer for molds
- Wax injector
- Burnout kiln
- Centrifugal casting machine with ceramic crucibles
- Vacuum casting table
- Sand casting
- Standalone furnace with graphite crucibles

Forming
- Over 200 stakes and anvils from 1" to 30" in various shapes
- Vise grips
- Forming stumps
- Hydraulic press, acrylic dies
- Vintage wire drawing machine, variety of draw plates
- 24" adjustable finger brake

Finishing
- Belt sander
- Buffing wheel with polishing compounds from coarse to mirror finish
- Polishing tumblers, various types of charge
- Ultrasonic cleaner
- Patinas
- Three enameling kilns
- Over 100 enamel colors, including dry form liquid enamels, enamel paints, transparent and opaque enamels

Advanced
- Pulse arc welder
- Laser welder
- Electroforming

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Materials

The SMFA Metals Studio is limited to work on non-ferrous metals, mainly copper and brass, but also bronze, pewter, tin, silver, and gold. Iron and steel must be worked with specifically marked tools. Please see the list below to get a general sense of the materials used in the studio and whether students must provide their own.

Available for use in the studio
Flux
Soap and metal cleaners
Binding wire
Pickle
Copper and brass scrap
Pewter and Tin (for class use only)
Sanding belts
Polishing compounds
Patinas
Enamels
Sealants
Donated costume jewelry, beads, etc.
Pin wire (for class use only)
Painter's tape, adhesives, wite-out
Sprue wax (blue)
Injection wax

Available for purchase at/through the School Store
Brass and copper wire 10ga - 22ga
Brass and copper sheet 16ga - 22ga
Silver solder wire in hard, medium, easy
Saw blades in 5/0 - 5 and 3 sizes spiral
Silver wire 12ga - 22ga
Wet/dry abrasive 80 - 500 grit
Wax (including red sprue wax)
Investment for casting
Bronze casting grain
Split mandrels, sanding discs, bristle brushes for Flexshaft

Purchase online
Brass and copper tubing
Silver sheet
Silver casting grain

Access

- Users may only access the metals studio when there is a manager, faculty member, or safety monitor present. The door will be unlocked when room is open.
- Scheduled classes have priority to use any space or equipment. This includes evening, summer, or weekend classes. Studio hours are 9am to 10pm unless otherwise stated on posted schedules.
    - The studio team reserves the right to close the studio at any time. We strive to keep the space accessible as much as possible, but maintenance, safety, and staffing issues do happen. Check the studio door for any notes on closings.
- Only monitors, TAs/SAs, students currently enrolled in a metals class, and active students who have previously taken a metals class at SMFA may use the Metals Studio. All must be in good standing with the Studio Team to use the studio.
    - Any others wishing to use the studio must get approval from the Studio Manager (pending training or bench test).
- Users may only use equipment they have been trained on by faculty or the Studio Manager. Monitors or fellow students may not provide training.
- If you would like to request access or training, please email the Studio Manager. Note that students enrolled in metals classes have priority use of the studio; classes and the Studio Manager's duties take precedence, so your request may not be granted or may be limited.
- You must be appropriately attired to use the studio:
    - Natural fiber clothing is recommended to prevent severe injury in case of fire. Long pants are strongly recommended.
    - Leather shoes are recommended to prevent severe injury in case of fire; NO OPEN-TOED SHOES or high heels.
    - Long hair must be tied back away from the face. This includes long bangs. Safety is more important than fashion! Ask the Studio Manager for hair ties and bobby pins if you don't bring your own.
    - No headphones, dangling jewelry, scarves, or loose long sleeves, as these can get caught in machinery and cause serious injury. Wireless headphones/earbuds are allowed when ear protection is not necessary (ie, forging), BUT you must keep one ear free.

Before accessing this studio, the user must sign an agreement form stating that they have been trained on the contents of this document. See Page 11 for a link to the form.

Studio Safety

Basic Safety

Metals is a HIGH HAZARD studio. This means there are FIRE hazards, HEALTH hazards, and REACTIVITY hazards (not to mention physical hazards since we have lots of heavy or sharp things).

Your safety is the most important thing in this studio!

- Any rules in place are there to make sure you and your fellow studio users aren't injured or exposed to long-term harms. Working with metals can be fun, but you HAVE to do it safely or you won't get the chance to do it for a long time. Tools can be replaced, projects can be re-made, but you, your eyes, hands, lungs, etc. can't!

Always be alert and observant when using the studio:

- SIGHT: Keep an eye out for safety violations.
- HEARING: Listen to your faculty, and make sure you are able to hear any warnings or messages from the Studio Manager or safety monitors, or even fellow studio users.
- SMELL: if you can smell something, either the vents aren't working properly or you're too close. If you smell gas, check that torch valves are closed and alert Studio Manager. Some patinas or chemicals have strong smells and should be used under a vent hood.
- TASTE: if you can taste copper or a metallic flavor, you're probably sawing or using a flex shaft without a mask. While the metals we use in our studio don't have the same toxicity levels as, say, lead, you should still protect yourself from ingesting or inhaling particles by wearing a mask, as long-term exposure to these things can cause harm.
- TOUCH: while we are in a studio where we work in a very tactile way, remember metal can have sharp edges and rough surfaces, chemicals can irritate your skin, and hot metal, torches, or tool parts can cause severe burns. Make smart choices and move slowly, with careful intent; keep fingers away from blades or high-speed machine parts; use tongs to pick up hot items, and remember that anything that moves at high speeds is bound to heat up.
- SPATIAL AWARENESS: our studio is small and getting busier by the semester. Be aware of where people are around you and stay out of the way of any tools or hot items. Be mindful of how much space you take up with your materials and tools, remembering that many surfaces, tools, and equipment are shared.

No food or open drink is allowed in the studio. Only drinks with lids are allowed.

We are a community, and we keep each other safe. If you see your peer doing something you know is unsafe, kindly alert them to their mistake. If you see something that needs the attention of a monitor or Studio Manager, let us know right away.

Do not EVER use the studio while intoxicated or impaired. This applies to alcohol, recreational drugs, and even prescription drugs – if your medication insert says to avoid driving or operating heavy machinery, do not use the metals studio. If a faculty member, Studio Manager, or monitor notices you're intoxicated or impaired, you will be asked to leave.

If you have any concerns about the materials being used in the studio, refer to the Safety Data Sheets (SDS) in the red and yellow binders around the studio. You have the right and responsibility to know about the potential health hazards associated with the materials you use, and how to protect yourself.

Ask the Studio Manager or your faculty if you don't know how to do something, where a tool goes, where materials are, etc. We would rather take the time to answer your question than to see you hurt yourself or someone else.

Emergency Procedures

In case of injury: the Studio Manager cannot provide first aid, but immediately alert Studio Manager or Safety Monitor who will contact TUPD. If it's more than a small cut, the Studio Manager or Safety monitor must fill out an Incident Report. If it's a serious emergency, call TUPD immediately **617.627.6911**. Do not wait for Studio Manager or faculty, just call!

- Eye wash station is located next to the main sink. Gas shutoff is outside the studio door. Chemical spill station is next to the office. Fire extinguishers are located around the studio near hot zones.

PPE and Engineering Controls

Users must wear personal protective equipment when in the studio.

- Aprons are recommended to prevent metal shavings from embedding in clothing.
- Goggles and earplugs are provided at no cost.
    - Safety goggles MUST be worn anytime rotary machines are used or hammering is done. Rotary machines include:
        - Flex shaft
        - Drill press
        - Belt sander
        - Bandsaw
        - Polishing wheel

    - Earplugs must be worn when forging, and closing the door to the forging room (A111D) is recommended if A111 is in use. Headphones are not suitable ear protection.
    - Tinted goggles and fire gloves must be worn when casting.
- Vents must be turned on before performing any work
    - Vents are divided into Zones A (enameling), B (soldering and flex shafts), and C (forging room).
    - Only two vent zones can be on at a time.
    - VENT ZONE C: Individual vent gates must be opened above the station in use. Only one piece of equipment/vent gate may be used at a time in Zone C.
- N-95 masks are strongly recommended during use of flex shafts and enamel. Please speak to the Studio Manager about getting fit tested and cleared for N-95 use.
- Red welding screen MUST be down when using the pulse arc welder.

Monitors

Trained Safety Monitors supervise the studio when the Studio Manager isn't present or when classes aren't running.

- Monitor schedules will be posted around the studio at the beginning of each semester.
- The monitor on duty will have a sign on their bench to indicate who they are.
    - Introduce yourself! Monitors will introduce themselves, too. It's much easier to ask someone for help when you already know them!
- Monitors are primarily responsible for keeping everyone safe, although they also take care to keep the studio clean and well-stocked.
    - Let a monitor know if any supplies are running low, if you walked in to see a mess in a specific area, etc.
- Monitors can usually help you with finding things around the studio. You can ask for help with a technical issue, but they may not know the answer. Monitors are not obligated nor allowed to train students on entire processes; please see the Studio Manager for training. If you're really struggling with something, a monitor may be able to reach out to the Studio Manager for further assistance.
- While monitors perform some cleaning tasks, they are not paid to clean up after you. Please clean up your own work stations.
- Interested in becoming a monitor? If you've taken a metals class, please reach out to the Studio Manager for more information on the application process.

Studio Etiquette

Respect the space and respect your community.

- The space is shared. Leave it in excellent condition for the next person to use.
    - Tools are shared. Return them to their spot as soon as you're finished using them (stakes, tools from crib, soldering bench, enameling area…)
        - Do not use tools marked with PINK. These are demo tools only.
        - The only tools that can leave the metals studio are the tools included in your kit.
        - Checked out kits must be returned in good, clean condition at the end of each semester, no exceptions. If you return an incomplete tool kit, you will be charged for replacements. If you fail to return your tool kit, you will be charged the full market value of the kit. You may be charged a cleaning fee for very dirty tools/kits.
    - Treat the space and the tools carefully – report any damage to the Studio Manager immediately. This is not to assign blame (unless caused by negligent or malicious misuse) but rather to prevent any further

damage to the equipment or injury to users, and to expedite repairs or replacements.

- NO STEEL in the metals studio! Steel is harder than brass, copper, and silver, and our tools are not designed for working it; using our tools on steel will damage the tools as they are softer. If you have steel you need to work, ask the Studio Manager for steel-specific tools (marked with TEAL), or use the welding shop downstairs.
    - PEWTER requires separate files. These are marked with PURPLE.
- Do not leave ANYTHING sitting in the sinks.
- Red carts are for class use only - do not take red carts out of A111 without asking the Studio Manager or the faculty teaching that day, as carts may be shared.

Equipment Guidelines

Treat the equipment carefully. Practice proper etiquette and maintenance:

Flex shafts

- Slow and medium speeds only - do not burn out motors!
- Lubricate! Then return Bur-life sticks to the crib.
- NEVER leave flex shafts sitting on the table. If you pause your work, stand up to get another burr, or are done using the station, leave the flex shaft hanging straight down off the table.
- Do not use metal burrs on wax, or wax burrs on metal.
- Take your personal burrs or mandrels with you and immediately return shared burrs to their spots in the crib.
- Sweep your area before leaving.
- Always return the switch on the motor to the neutral/off position when you're finished.

Soldering area

- Check if the vents are on before beginning any soldering!
- Only Safety Monitors, faculty, and/or the Studio Manager can turn on gas lines. If you arrive and the gas is off, please ask someone to turn it on for you.
- Keep flux pots closed. As soon as you're done brushing onto your piece, place the lid on top of the container, even if you don't close it all the way. If the rim becomes crusty, use a damp paper towel to wipe off as much dried flux as possible. Keep pumice and solderite out of flux pots.
- Return third arms, cross-lock tweezers, extra solderite or magnesium blocks, strikers, brushes, flux pots to their spots.

- Keep soldering picks and tweezers with your kit.
- Don't mess with the pickle pots! They should always be on "Keep Warm." If the pickle is low or spent, notify a monitor or the Studio Manager.
- Remember to take your work out of the pickle.
- Sweep or vacuum off loose solderite, magnesium, or pumice.

General machinery

- Avoid working with wet metal. This will rust our tools and machines. The only exception is when wet grinding on the belt sander or flex shaft – dry off burrs immediately.
- When you finish using machinery, return handles to upright or open position, clean off debris, and replace covers.
- Return drill bits, burs, or compounds/polishing wheels to their spots immediately. Do not mix polishing wheels and compounds.
- If using small appliances like the tumblers or ultrasonic, make sure you turn them off and unplug them before you leave. Rinse and strain tumbler shot.
- Sweep your area or use the shopvac to clean up.

Benches

- Hot wax work must be done under a vent, not at a bench.
- No sticky stuff directly on tabletops! Always put down board or paper when using wax, hot glue, resins, or other adhesives.
- Do not store personal items in the benches unless you have a bench contract.
- Sweep benchtop, empty catch tray before leaving the studio.

Casting

- Investment must be handled in the Plaster Studio (A314) under the Nederman Arm. Pay for your investment via the Studio Manager.
- Kiln burnouts MUST be confirmed with Studio Manager first. Refer to Metals Area Ventilation Guides posted around the studio.
- Melting dishes are labeled by metal. Please only use the dishes for their labeled material.
- If you're casting outside of class, the buddy system is mandatory. Make sure you have a friend *who is certified to use the metals studio* to help during casting (does not apply to sand-casting or pewter use, but is still recommended).
- Never put investment down the sink. Use the investment buckets.
- Clean your flasks in the investment buckets as much as possible.

Enamel

- Vents must be on for sifting. N-95s are STRONGLY recommended.
- Make sure vent gates are open above the kiln you use!
- Enamels must be dispensed by studio manager or monitor and digital form filled out.
- No cross-contamination! Leftover enamel goes in counter-enamel jar, not back in the original jar.
- Use shop-vac or wet towel to clean - avoid agitating loose powder!
- NO ENAMEL DOWN THE SINK!!!
- Return all trivets, mesh racks, firing forks, sifters, palettes, alundum stones, etc. to their places – the space should look like it was never used by the time you're done cleaning.
- If you dripped a significant amount of enamel on the kiln shelves, please notify the Studio Manager or a monitor so it can be cleaned up when the kiln has cooled.

CLEAN UP AFTER YOURSELF!!!!!!!!

- Any materials left behind – metal, solder, etc. – becomes studio property – take your stuff with you!
- Sweep your bench and chair and empty the catch tray before leaving.
- Get in the habit of returning everything to its spot immediately.

Please adhere to the guidelines set within this document every single time you use the metals studio so we can maintain a safe, functional environment that is welcoming to all. Leave the studio better than you found it. Keep tools clean and in good shape. Hold yourself and your fellow students to the highest standards, and help us build a strong and successful metals community!

In order to access the Metals Studio, you must sign your understanding of and agreement to these policies using the form below:

https://tufts.qualtrics.com/jfe/form/SV_26nfUC5xUCp6f3M