

# UM Taubman College Metals Lab Handbook

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# Metals Lab Mission

The Taubman College Metals Lab provides students and faculty with the facilities, equipment and training to design and construct projects using a wide range of ferrous and non-ferrous metals. The Metals Lab provides the opportunities to work with a full range of rolled structural shapes in mild steel, stainless steel and aluminum. We also provide resources for working with sheet metals of all sizes and alloys.

## **Teaching and Training**

The primary function of the Metals Lab is to provide training and learning opportunities for the Taubman College in the design and fabrication with metals. Regular shop and tool introductions are scheduled at the beginning of each semester. Welding tutorials are provided at scheduled intervals throughout the semester. Faculty are encouraged to coordinate work in the lab with studio and seminar projects and arrange for training and design development support from the Metals Lab.

The Metals Lab supports a wide range of welding technologies including MIG, TIG, stick welding as well as high and low temperature brazing. Additional equipment for cutting, bending, grinding and finishing of both structural shapes and sheet metal are available.

## **Coordination with FabLab**

The Metals Lab fully integrates the resources of the Taubman College FabLab and serves as a further set of resources for assembly, fabrication and finishing for work developed in the FabLab, in design studio or in other A+A building shops. In addition to Taubman College resources, the Metals Lab coordinates collaborative work in the UM A+D metals, sculpture and ceramic labs to provide additional material and fabrication opportunities for Tauman College students and faculty.

## **Research and Project Support**

In addition to teaching and training the Metals Lab offers project development support and technical assistance to Taubman students, faculty and staff through all phases of design, detailing and fabrication of project work. This support is available for projects large and small, for individuals, teams, studios and faculty research.

## Lab Schedule and Access

The Metals Lab is available to all Taubman College students and faculty after completion of introductory training sessions. During scheduled lab hours the Metals Lab coordinator is available for design consultation, training and fabrication assistance. Due to the hazardous nature of the work and equipment the Metals Lab equipment is not available for use on a 24/7 basis. For reasons of safety and security the Metals Lab is not available for unsupervised use. The Metals Lab will make every reasonable effort to accommodate student and faculty project schedules. Early planning and scheduling of any work is very important.

Any announcements or changes in schedule will be posted on the door outside room 1223A. For the 2018-19 academic year the lab will be open with the following schedule. Lab hours are subject to change.

M-F	8:30 am – 7:00 pm
W	8:30 am – 10:00 pm
Saturday:	Hours by appointment
Sunday:	Closed

Lab Coordinator:

Mick Kennedy 1223A A+A  
mickk@umich.edu

### Access

It is highly recommended that you speak with the lab coordinator in the planning stage of projects involving the Metals Lab equipment or materials. This will allow for input on issues you may not have considered such as material limitations, procedures, jig-making and scheduling. Please inform the coordinator in advance of your planned work-session in order to best guarantee dedicated consultation and help. *For reasons of safety and security the Metals Lab is not available for unsupervised use.*

# Welding Tutorials and Tool Introductions

A major goal of the Metals Lab is to empower and encourage all students and faculty to incorporate metalworking and fabrication into their basic repertoire of design exploration, model making, and construction activity. A key component of the coordinator's role is in teaching, assisting and facilitating the adoption of the necessary skills and confidence to work with these areas.

Introductory tutorials on Metals Lab equipment and MIG welding will be held according to the following schedule:

## **Tutorial Scheduling**

Sessions by appointment schedule to begin at the following lab hours.

M W                      9:00 am and 1:00 pm

Please contact the Metals Lab Coordinator to schedule a tutorial session.

## **Tutorial Sessions**

Tutorials are limited to four per session and will last 1-1/2 hours depending on the size of the training group. If you cannot make your scheduled tutorial session, please contact the coordinator with as much lead time as possible as there may be another person waiting for a session.

Introductory manuals for MIG and TIG welding are available on the Metals Lab webpage. Please review these manuals prior to your training session(s).

## **Coordinating with Studio or Other Courses**

Faculty members are encouraged to make use of the lab for their courses. Those wishing to do so should meet with the coordinator at least two weeks in advance to discuss the project, relevant space requirements, work flows and general schedule constraints.

# Metals Lab Policies

## **Your Opportunities in the Metals Lab**

Tutorials and Training

Design Planning and Fabrication Strategies

Material Procurement and Handling

Fabrication Processes

Finishing

The Metals Lab supports project work at a range of scales, materials and levels of coordination with other A+A shops. You will be empowered to design and build metal fabrications at a range of scales from small studio models, frames and support brackets, to furniture, installations, and buildings.

You will learn essential metal fabrication skills such as welding, grinding and finishing, shearing and folding sheet metals, assembly large frames and structures, bending metals rods and tubes, brazing and soldering.

You will gain valuable experience and confidence in the full range of project development from concept to schematic design, material sourcing and costing, to detailing and adjustment for material tolerances, to production, fitting and assembly.

## **Your Responsibilities in the Metals Lab**

The Metals Lab has workstations and work tables and areas for use on a collective and cooperative basis. Please be respectful of the work area, tools as well as the work of others. Personal safety in the lab area is a collective concern and effort. Be aware of others and look out for each other's safety.

**Please do not bring any beverages into the Metals Lab area.** A lot of voltage around and liquids are a bad idea. *A really bad idea.*

**Before completing your Metals Lab worksession. You are required to:**

- \_Make certain all welding equipment is turned off. Close all gas tanks.
- \_Replace all welding helmets, jackets and gloves to their respective places in the cage area.
- \_Replace all hand tools to their respective tool boxes, bins, etc.
- \_Put all metal scraps in either the scrap bins or recycling as appropriate
- \_Throw away all trash, papers, jig material etc. in the appropriate bins.
- \_Sweep floor area around the work tables.

Everyone working in the FabLab / High Bay / Metals Lab should consider themselves individually and collectively responsible for keeping the area clean, uncluttered and safe. *Watch out for yourselves and each other. Clean up after yourselves and each other.*

# Metals Lab Safety

## Metals Lab Working Attire

The Metals Lab has a range welding helmets, goggles, jackets, hats and gloves for use in the welding area. While not inherently dangerous welding can be hot and dirty work. You are required to wear long pants and leather boots or shoes. Loose fitting, work clothing is highly recommended. **No one wearing sneakers, open toed shoes or sandals will be allowed to work in the lab.** This requirement will be strictly enforced out of real concerns for safety.

The Metals Lab does not provide *work gloves* for general use in the High Bay and FabLab. **Do not use welding gloves for general work glove purposes.** The welding gloves are expensive and their misuse in other applications may compromise their effectiveness and safety for welding purposes.

Eye safety is of utmost concern when working in the Metals Lab. Eye protection is required during all work of any kind in the Metals Lab: welding, grinding, drilling, cutting etc. Eye safety glasses are available and are located along with the basic safety materials on the North Wall of the FabLab. Eye safety glasses and goggles are located in the welding cage in the SW corner of the Metals Lab.

In the event of a minor injury there is an orange First Aid kit located in the Metals Lab. In the event of a more serious injury please contact FabLab staff or the Metals Lab coordinator immediately for assistance.

There is a fire extinguisher located in the Metals Lab and also along the North wall of the FabLab. Instruction in their use will be part of your introduction to working in the Metals Lab.

## Material and Project Storage

Project materials can be stored in the overhead racks in Metals Lab area or sheet metal bin near the water-jet cutter in the FabLab. It should be clearly tagged with your name, the time period for storage and your username for contact information. The Metals Lab cannot be responsible for materials stored in the lab. All scrap materials from your work should be removed from the lab or placed in the scrap bins for use by others.

The collective and cooperative ambitions of the High Bay work area seeks to allow areas for larger scale student and faculty projects to take place. This goal will only be as successful as the level of responsibility and cooperation of the all working in the High Bay. Everyone working in the High Bay should consider themselves individually and collectively responsible for keeping the area clean, uncluttered and safe. *Watch out for yourselves and each other. Clean up after yourselves and each other.*

All work-in-progress left in the Metals Lab area must be cleared first with the coordinator. **All project work should be clearly labeled with the date, contact name and username.**

Be responsible about your work and communicate your intentions. **Work left untouched for more than one week will be relocated at the discretion of the coordinator. Work left untouched for more than two weeks will be recycled at the discretion of the coordinator.**

# Lab Resources

2 Miller 110v MIG welding workstations  
1 Miller 380v MIG welding mobile workstation  
1 Miller 350 Synchronwave LX TIG welding mobile workstation  
1 Miller LSMW mobile spot welder  
2 Controlled Descent Horizontal Metal Band Saw (one in Wood Shop)  
Vertical Band Saw (Wood Shop)  
High Production Cold Saw  
Metal Work Drill Press

3' Shear 16g capacity (hand operated)  
4' Shear 12g capacity (power driven, located in Stamps Sculpture Studio)  
3' Break 16g capacity  
4' Break 14g capacity

Various and sundry grinding and finishing tools, saws and associated power tools for jig making, fabricating etc.

Additional metal working equipment is located in the A+A building Wood Shop. Access can be arranged for the wide range of metal working equipment in the College of A+D Metals Shop.

If you are interested in acquiring any personal welding equipment, tools or attire check with:

## **Lessors Welding Supply**

4105 Jackson Rd.  
Ann Arbor, MI 48103  
734 761-9100

## **Ann Arbor Welding Supply**

4811 Carpenter Rd.  
Ypsilanti, MI 48197  
734-572-0444

Friendly and helpful folks at both locations.

# Material Resources

## **Alro Metals Plus**

2466 S. Industrial Hwy  
Ann Arbor, MI 48104  
(734) 213-2727

Alro carries a wide assortment of structural shapes, rods and sheet metal at reasonable prices on a cash-and-carry basis. Larger orders, better prices and deliveries can be arranged through their home office in Jackson, MI.

## **Alro Steel**

3100 E. High St.  
Jackson, MI 49204-0927  
(517) 787-5500

## **Factory Steel and Metal Supply**

14020 Oakland Ave.  
Detroit, Michigan 48203  
313-883-6300

Factory steel carries a wide range of high strength tubing, bars and other precision metal stock. A particular wide range of non-ferrous metals. Worth the drive to Detroit.

## **McNichols**

[www.mcnichols.com/](http://www.mcnichols.com/)

McNichols carries a wide range of perforated, stamped and embossed sheet metals as well as an array of expanded metal lathe, gratings etc.

## **Scrap and Recycled Metals**

No surprise that Detroit is well stocked with scrap metal yards. Most are willing to sell you metal on a per pound basis. Who knows what treasures you might find? Don't expect special service or attention.

## **Kimmel Scrap Iron and Metal**

10571 Grand River, Detroit, MI

48204 313 934-2141

or check at [www.detroitscrapmetal.com](http://www.detroitscrapmetal.com)

## **Regal Recycling**

645 Lucy Rd. Howell, MI 48843  
517 546-3820

Regal Recycling is perhaps the coolest junkyard you will ever visit. They also sell a wide range of steel sections and sheet metal at significant discount. Howell is about a half-hour drive from Ann Arbor and may well be worth the trip to save a lot of money on your project. And to visit the amazing junkyard.

## More Material Resources

### **Fastenal Ann Arbor**

1776 E Ellsworth Rd  
Ann Arbor, MI 48108  
734-665-9060

A great local source for a wide variety of nuts, bolts, fasteners, clips, etc. etc. in a huge array of sizes, finishes and metals. Very good prices and helpful staff.

### **McMaster-Carr**

[www.mcmaster.com/](http://www.mcmaster.com/)

McMaster-Carr is a huge distributor of industrial products large and small: from soup to nuts. Everything under the sun. Helpful staff, usually next day shipping at no extra cost. A great, great resource.

### **Grainger Industrial Supply**

[www.grainger.com](http://www.grainger.com)

Similar range of products as McMaster Carr. They do have a supply house in Ann Arbor, though they can be prissy about selling directly.

2915 Boardwalk St.  
Ann Arbor, MI 48104-6765  
734-662-1060

### **Haefele**

[www.hafele.com/us/](http://www.hafele.com/us/)

The US branch of the great German architectural hardware company. All types of amazing hardware for furniture, cabinetry, kitchens, industrial uses, showcases etc.

### **Sugatsune**

[www.sugatsune.com/](http://www.sugatsune.com/)

If anyone makes nicer hardware than Haefele it is Sugatsune. Get one of their catalogs.

# Fabrication Resources

## **Le Forges Pipe and Fabrication, Inc.**

64 Ward Road  
Ypsilanti, MI 48198-4233  
734-482-2100

Tube and steel section bending and fabrication services. You should allow a minimum of one week for scheduling and work sent out.

## **Lasers Unlimited East Inc**

46918 Liberty Dr  
Wixom, MI 48393  
(248) 624-4597  
[cad@luieast.com](mailto:cad@luieast.com)

Water-jet cutting of aluminum and steel. Owner offers UM friendly pricing.

## **Michigan Sandblasting**

michigansandblasting.com  
12980 Inkster Rd.  
Redford, MI 48239  
313-533-9890

Sandblasting, painting and powdercoating services

## References and Links

Miller Welding: <http://www.millerwelds.com>

Lincoln Welding: <http://www.lincolnelectric.com/>

Welding Safety: <http://www.osha.gov/SLTC/weldingcuttingbrazing/>

Please see the Metals Lab page at the Taubman College website for downloadable MIG and TIG welding manuals and tutorials.

[http://taubmancollege.umich.edu/architecture/resources/workshops\\_and\\_labs/metals\\_fablab/](http://taubmancollege.umich.edu/architecture/resources/workshops_and_labs/metals_fablab/)