

Appendix 2.

Environmental Scan - Local Makerspaces

The following information provides a brief summary of some existing local Baltimore Area Makerspaces.

Digital Fabrication Studio (dFab) at MICA

http://www.mica.edu/Academic_Services_and_Libraries/Fabrication_Studios.html

This studio offers 3D printing and various machine power tools. During certain hours the laser cutter is staffed by a student tech. Use is on a first come, first serve basis. The space offers laser cutters, CNC Mills, routers, and 3D Printers. The 3D printing includes a very high resolution photopolymer printer (Objet30), a high resolution powder-based printer (ZCorp 310), and plastic extrusion printers (RepRap Prusa Mendel, Rostock, and Kossel). The software used in this studio includes Netfabb, Objet, RepRap Prusa, Mendel, Rostock, and Kossel. Their audience is somewhat more educated on the use of these items since the use of these tools are curriculum based at MICA. The digital fabrication studio is staffed with one full-time technician and several student technicians and they are in the studio for assistance during the lab's operation hours from 10am-10pm. Students use this facility for their class projects. They offer workshops sometimes. People who go to dFab spend most of their time around computers. The computer area has 11 PCs with Rhino, Autodesk, Autocad, and Solidworks. They offer Lynda.com subscription from MICA. It was their belief that building a community is more important than tools themselves.

FabLab Baltimore at Catonsville - Community College of Baltimore County (CCBC)

<http://www.fablabaltimore.org/>

The Fab Lab is approximately 1,320 square feet and is a non-profit community workspace and educational center. It has 6 staff members. They have an Epilog Laser Cutter and an universal laser cutter. Both are available to reserve. Their shop equipment consists of a ShopBot CNC Router, Torchmate CNC Plasma Cutter, Multiplaz Plasma Welder & Cutter, a uPrint Plus 3D Printer, MakerBot Replicator2 3D printer, Afinia 3D Printers (2), a ZCorp 3D scanner and a Roland vinyl cutter.

For their 3D modelling software encouraged to be used includes 123D Design, SolidWorks, Google SketchUp and .stl files. They offer a variety of workshops available to the public but to use the equipment you must be a lab member. Their website offers equipment type and status, cost of use at a particular quantity of materials, online class reservation and hours along with staff information.

Baltimore Node

www.baltimorenode.org

403 East Oliver Street

They call themselves Baltimore's Makerspace for hackers, makers, diy and crafters.

A member run makerspace 2300 square feet after its third expansion. It operates on a membership dues and donations model and is pursuing 501(c) (3) status. The tools and equipment offered in the space are wide ranged including; Digital fabrication tools: Makerbot Replicator (Dual extruder), Makerbot Cupcake CNC, 60x90mm 80W Laser cutter. Electronic tools: Oscilloscopes, Breadboards, digital multimeters, wire cutters and strippers, power supplies and small components (resistors, switches, etc.)

General-purpose shop tools: general-purpose hand tools: wrenches, screwdrivers, nutdrivers, pliers, etc.

Other resources available include:

- Workbenches and machinist's vises, files, corded and cordless drills, drill presses.
- Woodworking and carpentry tools:table saw, compound miter saw, jointer, thickness planer, radial arm saw,woodworking bench with vises and dogholes.
- Various hand tools: saws, chisels, planes, etc. Handheld electric tools: drills, router, circular saw, jig saw, etc. and a Router table.
- Metalworking tools including a metal lathe, forge, and an anvil.

The Baltimore Node hosts and "Open Hack" every Thursday at 7 p.m. where they invite people to come in and meet others, share ideas and get to know each other.

Baltimore Hackerspace

www.baltimorehackerspace.com

Teaching and Learning

They are a 501 (c) (3) and is paid for by donations and membership dues. There tools and offerings include drills, grinders, saws, lathes, drills, routers, oscilloscopes, engravers and a 3D printer MakerBot. Other resources available include: Mig Welder,drill press, grinder, BandSaw, Disc,belt sander, metal lathe, cordless drills, sanders,routers, soldering equipment, Oscilloscopes, parts bins, laser cutter, engraver, wood CNC, air compressor.

Baltimore Foundry

207 S. Central Ave.

www.bmorefoundry.com

The Baltimore Foundry is 2,000 square feet with room to expand. They are membership based charging for access and additional amounts for a dedicated work bench. Their equipment offerings include a wide range of equipment offerings including several welding tools, saws,

grinders , sanders and a 3D milling machine. They offer classes in welding, aluminum brazing, an introduction to microcontrollers, Project Night, and CNC laser orientation.

Baltimore Underground Science Space (BUGSS)

www.bugsonline.org

Designing and Biology, (A place for creative Biology)

King Cork and Seal building at 101 N. Haven Street, Suite 105

bugssonline.org

This space has limited hours, is non-profit, and is in the process of becoming a 501 (c) (3) . They have a building with approximately 2,500 square feet of space. To use the space there is a membership of \$100 including safety course and \$85 per month thereafter, or \$850 per year. They offer classes and space and equipment for biohacking—thermocyclers, incubators, centrifuges, etc. They are definitely more interested in advancing the sciences and have less building equipment than other places visited. They do have a 3D printer that they have converted and are trying to make it more of a biological 3D machine.

DMC Digital Media Center at Johns Hopkins University

<http://digitalmedia.jhu.edu/makerspace>

The DMC is funded with student fees. They have a wide variety of offerings including: audio equipment, digital still cameras, game systems, game library, lighting and video. Software available includes : Adobe CS6, Logic Studio 9, Pro Tools X, Ableton Live, Melodyne, Sibelius 6, Final Cut Pro X, Trapcode Particular and Autodesk Bundle.

A dedicated makerspace offers access to a variety of tools and technologies including 3D printing on a Makerbot 2x D printer. They offer online reservations and web checkout by using a product called Onshore that works with ISIS for online reservations. Also of interest was a dedicated area with computers and access to training software such as Lynda Training and also design tools. Their audience is mostly JHU Humanities students but they acknowledge there is an interest from other programs. They also serve as the digital media group checking out large numbers of equipment pieces ranging from cameras to google glasses. Prices for 3D printing consumables are listed on their website for both ABA and PLA plastic and are determined by weight used.

Other equipment available include an Archival photo printer -Epson stylus pro 40, flexible spaces and storage spaces, Ardweeny and Raspberry Pi, Data visualization Google glasses, Bitten maker, Vinyl cutter, 3d scanner, C&C cutter, and a Laser cutter.

Workshops and training include: LED origami project where attendees get to make their own creation and basic safety training and use of goggles.

BMore3D

Bmore 3D claims to be the first 3D printing and 3D scanning pop-up store in the mid-atlantic. They offer 3D printing, scanning, and design services. They provide design consultation and 3d design services and have experience in creating movie props, advertising and event promotion material, jewelry, replicas, new products, and engineering prototypes.

The Object Lab at Towson

<http://www.towson.edu/art/undergraduate/artstudio/interdisciplinaryobject>

Operating under the Fine Arts program the Object Lab offers 3D printing and TU-2 lectures. Includes 3D Printing, scanners and laser cutters. They have classes on building objects in 3D software.

The 3D Object Lab was created by partnering with manufacturing organizations around the state. The Object Lab is a state of the art digital fabrication facility that provides students access to technologies across the entire digital fabrication ecosystem. Students can learn various CAD (Computer Aided Design) programs, 3D scanning, 3D printing, laser cutting and CNC milling. The campus uses this Lab as an integral part of their 3D Classes and modeling classes.

UMPC

Offered as specialized printing at UMCP's Mckeldin's Library, the MakerBot 2X 3D printer is available to students to print objects from files that are in STL, or stereolithographic file format. Other UMCP programs have 3D printing for their own departmental use but not advertised.

Also of Interest

3D Maryland - Innovations and Prototyping Lab

Howard County Maryland Economic Development Authority

<http://www.hceda.org/maryland-center-for-entrepreneurship/3d-maryland/innovation-plus-prototyping-lab.aspx>

America Makes (formerly National Additive manufacturing Innovation Institute (NAMII))

<https://americamakes.us/>