

MadLab

Innovation Workshops Brochure

Summer 2019



CONTENTS:

1. MISSION

2. ELECTRONICS

- i Learn to Solder
- ii Arduino
- iii Get the Bug for Coding with Code Bug
- iv Coding with the micro:bit
- v Otto Robots
- vi Virtual Reality Experience
- vii Computer Game Design
- viii 3D Head Scan and Print
- ix Create Your Own MIDI Devices
- x Creative Coding with Processing
- xi 3D Printed Emojis
- xii 3D Laser Cut Emojis
- xiii Intro to Live Visuals Using VDMX

3. RASPBERRY PI

- i Coding Music
- ii Hacking Minecraft
- iii Programming Scratch
- iv Physical computing with Scratch
- v Game Development in Scratch

4. SCIENCE & DIGITAL MAKING

- i Science Busking
- ii 3D Printing Demo
- iii Wearable Tech
- iv Conductive Paint
- v Doodle Bots

5. PATTERNCRAFT

- i Binary Minecraft Animation
- ii Encoding Data
- iii Infrared Circuits

6. ADDITIONAL INFORMATION

7. CANCELLATION POLICY

1 MISSION

Welcome to MadLab, the UK's longest-running and **most active** makerspace. We're passionate about making Science, Technology, Arts and computing not only fun – but relevant, compelling and exciting – to a broad and rapidly growing spectrum of users.

MadLab also works on behalf of organisations, schools, local councils, third sector and creative/ tech organisations, to deliver making and digital courses to their users.

MadLab's creative workshops are perfect for continued professional development and can be tailored for teachers and educational professionals teaching at any key stage level.

Previous clients include: Arts Council England, FutureEverything, Jaguar Land Rover, The Prince's Trust, The Wellcome Trust, Nesta, The Nominet Trust, The University of Manchester, Manchester Metropolitan, Brighter Sounds, Whitworth Art Gallery, Manchester City Council, and John Lewis.

Contact us:

email: learn@madlab.org.uk

twitter: @madlabuk

2 ELECTRONICS



i. LEARN TO SOLDER

The 'I Can Solder Badge' is a basic soldering kit that provides the ideal platform for teaching people how to solder. A couple of minutes and the deft wave of a soldering iron, and you'll soon have a flashing badge to wear with pride!

Our Learn to Solder workshop is best run as a drop-in session. Each badge takes just 5 – 10 minutes to complete, and one facilitator can instruct up to four people at one time.

Suitable for beginners

ii. ARDUINO

Arduino can be used to make all kinds of things, from tiny wearables to large-scale interactive installations. Versatile, beginner-friendly, and above all fun, this workshop will give you an insight into how to get started with your own excellent digital-physical projects.

Suitable for beginners

iii. GET THE BUG FOR CODING WITH CODE BUG

A fun and engaging introduction to easy drag-and-drop programming and electronics. CodeBug is a Manchester-born initiative, designed as a fun and engaging introduction to drag and drop programming and electronics.

In just a few clicks you'll program this versatile little computer to display your own message. By the end of the session, you'll have created a scrolling name badge and a many-faced bug!

Suitable for beginners

iv. CODING WITH THE MICRO:BIT

The BBC micro:bit is a tiny programmable computer, designed to make learning and teaching easy and fun. From making an interactive badge, hand-held electronic games or 'fitbit' style stepometers the options are extensive.

This workshop is suitable for beginners

v. OTTO ROBOTS

Otto is an interactive robot that anyone can make. It's open-source, [Arduino](#) compatible and 3D printable, the perfect opportunity to build and have your very first robot, learn robotics and have fun.

NB. Otto needs to be 3D printed prior to the workshop. This workshop is ideal for testing a new 3D printer or getting to grips with 3D printing and electronics at the same time.

This workshop is suitable for those who have played with basic electronics before.

vi. VIRTUAL REALITY EXPERIENCE

Led by our experienced tutor, we will guide you on the use of a VR Headset, set up fun challenges and then get hands-on with your own Virtual Reality experience! Learn to use an Oculus Rift VR headset for an in depth VR experience or enjoy Google Cardboard, with headsets for you to decorate and take home. Not only is this a fun experiment, this workshop covers the basics through to participation.

This workshop is suitable for beginners to experienced users. Session timings are dependent on the number of participants and the VR experience chosen. For Google Cardboard take home headsets, we can provide these as an extra add-on, costs given at time of booking.

vii. COMPUTER GAME DESIGN

In this workshop, you'll learn how to make your own fully functional computer game from our onsite experts. Get your creative ideas flowing by playing on some great game examples then a quick storyboarding and planning session will help you find what type of game you'd like to create. We will iron out any problems by testing your game with the group and when your game is finished, we'll project a live demo on our big screen for the rest of the group to see. (Where available, games will be published online so you can continue to play after the session has ended.)

viii. 3D HEAD SCAN AND PRINT

In this workshop, you'll have your head 3D scanned and 3D printed in miniature to use as a new Facebook profile picture, trinket on the mantelpiece, or as a keepsake! We'll give you an overview on 3D printing and scanning, along with some knowledge that you can try at home.

As 3D printing is a relatively long process, we'll print the heads and post them to you as soon as they are ready.

This workshop is also available to do in pairs.

ix. CREATE YOUR OWN MIDI DEVICES

Learn how to create your own midi controllers using Arduino on this half-day (4-hour) workshop!

Chris Ball (Arduino wonderkid) has used Arduino extensively to create MIDI faders, laser harps, a variety of theremins, and other bespoke devices. The Arduino project has brought open source electronics to the masses, aided by its low price and simplicity. If you'd like to get into using Arduino to create musical instruments, this is the course for you!

x. CREATIVE CODING WITH PROCESSING

Learn the Java-based programming language Processing on this four-hour workshop, perfect for both artistic and educational purposes.

Creative technologist Chris Ball will take you through all the things you need to know to get you started with Processing and its many applications.

Processing's open source status encourages audience participation and development, allowing for a huge library of projects to draw inspiration from, and a community of users to contribute and push the possibilities of the software.

xi. 3D PRINTED EMOJIS

On this two hour workshop you'll learn the basic principles of 3D modelling using free online software Tinkercad. Using the cube tool, you'll build a 3D model of your favourite emoji – or create your own! You'll then export your file to be printed using Ultimaker 3 software – Cura. The MadFabLab team will then print these for you to collect.

This course is suitable for all abilities, and we welcome beginners with no previous experience.

xii. 3D LASER CUT EMOJIS

On this 2.5 hour workshop, you'll learn the basic principles of 3D modelling using free online software Tinkercad. Using the cube tool, you'll build a 3D model of your favourite emoji – or create your own! You'll then be introduced to Slicer, a modelling software that will prepare your model to be laser cut and assembled in stacked slices.

This course is suitable for all abilities, and we welcome beginners with no previous experience.

xiii. INTRO TO LIVE VISUALS USING VDMX

This 6 hour workshop will introduce you to the basics of the live video manipulation software, VDMX. Participants will learn the interface, how to mix videos and apply effects, as well as the artistic principles of live video performance. This process is also a great experimental way of making audio-visual pieces without time-consuming software.

This workshop is aimed at people with no prior knowledge of VDMX. Participants will need to be confident with using computers, and preferably with a knowledge of music and/or video software.

3 RASPBERRY PI

All our Raspberry Pi workshops are taught using the Pi-Top CEED, all equipment can be supplied by MadLab.



i. CODING MUSIC

Learn to code creatively on the Raspberry Pi by composing or performing music in an incredible range of styles!

Suitable for beginners

ii. HACKING MINECRAFT

Explore the virtual world of Minecraft Pi, and use Python to manipulate the world around you.

Learn to teleport, set blocks within the Minecraft World, leave a trail of flowers as you walk, blow up huge TNT blocks on command, flow lava, and create your very own 'whac-a-block' game!

Suitable for beginners

iii. PROGRAMMING SCRATCH

With Scratch, you can program your own interactive stories, games, and animations – and share your creations with others in the online community.

This workshop teaches fundamental coding concepts such as sequencing, repetition, variables, selection and operators.

Suitable for beginners

iv. PHYSICAL COMPUTING WITH SCRATCH

Use Scratch to control the GPIO pins on a Raspberry Pi. Create simple circuits to flash an LED and control a traffic light system.

Suitable for beginners

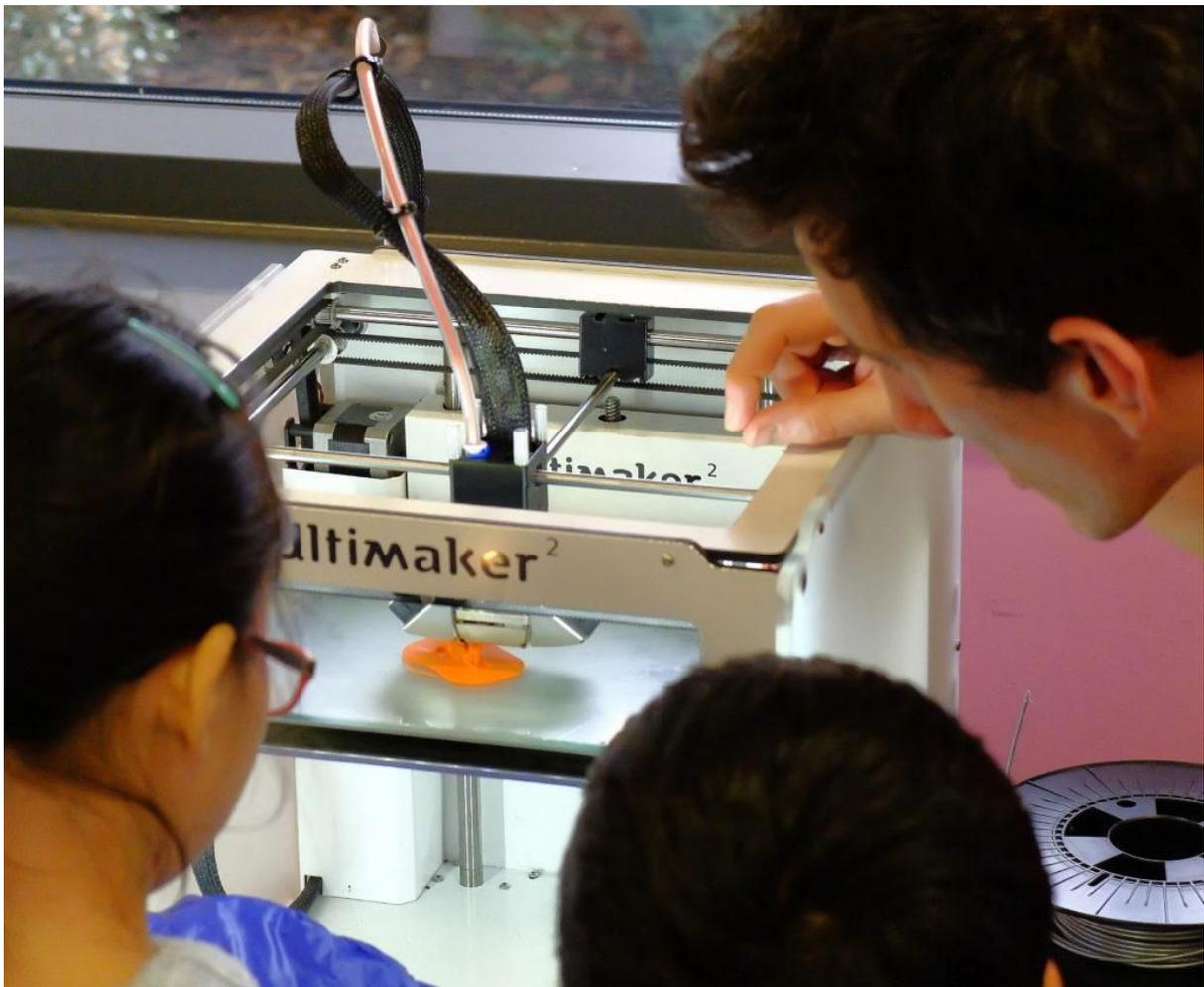
v. GAME DEVELOPMENT IN SCRATCH

Put your basic coding skills into practice to create games in Scratch on the Raspberry Pi.

Suitable for learners already comfortable with basic coding concepts in Scratch

4 SCIENCE AND DIGITAL MAKING

Sew and paint electronics or get messy with physics, our science and digital making workshops offer a fun, alternative approach to science and technology.



i. SCIENCE BUSKING

Our science demonstrations use simple everyday ingredients to conduct experiments that wow!

Get hands-on with engineering or messy with physics. With a large range of exercises we can tailor each session to your requirements.

Suitable for beginners

ii. 3D PRINTING DEMO

You've heard all about them, now see one in action! Our 3D printer will be running all day, come watch and maybe take home your own 3D printed mini mascot.

Suitable for beginners. Each item takes 30 - 60 minutes to print.

iii. WEARABLE TECH

Explore the future of fashion and technology and design your own tech tote bag. In a 2-hour session you'll construct a sewn circuit, sew with conductive thread and make your LEDs light up while having tons of fun along the way!

Suitable for beginners

iv. CONDUCTIVE PAINT

Get creative and bring to life a collaborative canvas of art & light. Using imagination to draw simple image of your choice, while learning how to incorporate a battery and LED to complete a circuit, adding some twinkle to your picture.

Suitable for beginners

v. DOODLE BOTS

Come and join us making a Doodlebot, a chaotic vibrating drawing robot that creates fascinating patterns as it swirls around and around. Those taking part in the workshop will use engineering learning on how to build simple electronic circuits and using physics to control how gently or vigorously their doodle bot responds, everyone will be unique.

Suitable for beginners

5 PATTERNCRAFT

PatternCraft is an analogue to digital punch card reader that teaches the fundamentals of programming and encoding data through the write-once medium of a physical punched card.

With links to binary and the computing curriculum as a whole, PatternCraft is a cross curricula tool that can be used for in the support of STEM activities and support soft skill development in areas of creativity, problem solving, team working and communication.

Designed and created by Gemma May Latham, an artist and maker, Gemma is interested in the relationships between textiles and coding. Having only started to learn to code in 2012, Gemma endeavors to develop accessible methods for understanding code and computing theory.

We offer a wide range of workshops using PatternCraft, detailed below.



i. BINARY MINECRAFT ANIMATION

Explore how binary data is used to store images in the form of 0s and 1s and create images in Minecraft using punch cards. Following this introduction learners will work in groups to design and program an 8x8 2D animation in Minecraft. Advanced learners will have the opportunity to explore the Python coding behind the process and make changes to their animation by editing the code.

Suitable for everyone

ii. ENCODING DATA

Use punch cards to explore how binary is used to store data in the form of 0s and 1. participants will be learn how to convert denary numbers to binary and encode and decode numbers using Minecraft builds. The group will then progress to creating messages using the ascii alphabet and use punch cards to make text appear on screen.

Suitable for everyone

iii. INFRARED CIRCUITS

Beginning with an introduction to PatternCraft, participants will make a punch card and see their data translated into a Minecraft build. The group will then explore how the reader works, building infrared detectors using simple components and electronic prototyping boards. They will be encouraged to test the detector using different 'punchcard' materials and varying hole sizes and draw their circuits using recognised symbols.

Suitable for everyone

6 ADDITIONAL INFORMATION

The duration of the workshop can be tailored to suit your requirements, the minimum for each being one hour. Many can be arranged as a drop-in session to run within a larger event, or as a package of workshops.

Facilitator times include travel, setup and clearing down. Drop-in workshops run for a length of time of your choosing. Please allow 1 hour for setup and 30 minutes for clearing down. Please also note facilitator costs are in addition to any material costs, dependant on the number of facilitators required and the length of activity.

Unless otherwise specified, computers/laptops are not provided. These can be hired from MadLab, or would need to be made available by the venue or provided by the learner. We would also require the venue to have open access to free wifi.

Workshops outside of Greater Manchester may also include travel and accommodation costs.

7 CANCELLATION POLICY

In the event of cancellation, we cannot offer refunds with less than two weeks notice of the event and we will expect payment in full.

MadLab hires independent tutors to lead workshops, and as part of a fair working contract with them, we make sure that we give them notice of any changes. This policy ensures we can provide you with high quality tutors at all times.