



CS4HS
Plug and Play
Demo

WELCOME & INTRODUCTIONS

Presenter: Dr Donna Cleveland
Associate Head of Learning and Teaching
Lecturer in Creative Technologies
School of Future Environments
Auckland University of Technology

TODAY'S SESSION

- Learn a bit about what plug and play is and the technical side of off the shelf solutions and look at different materials for creating with them....
- In the demo I have created:
 - Heart monitor
 - MakeyMakey device, to sketch it - play it!
 - MakeyMakey piano

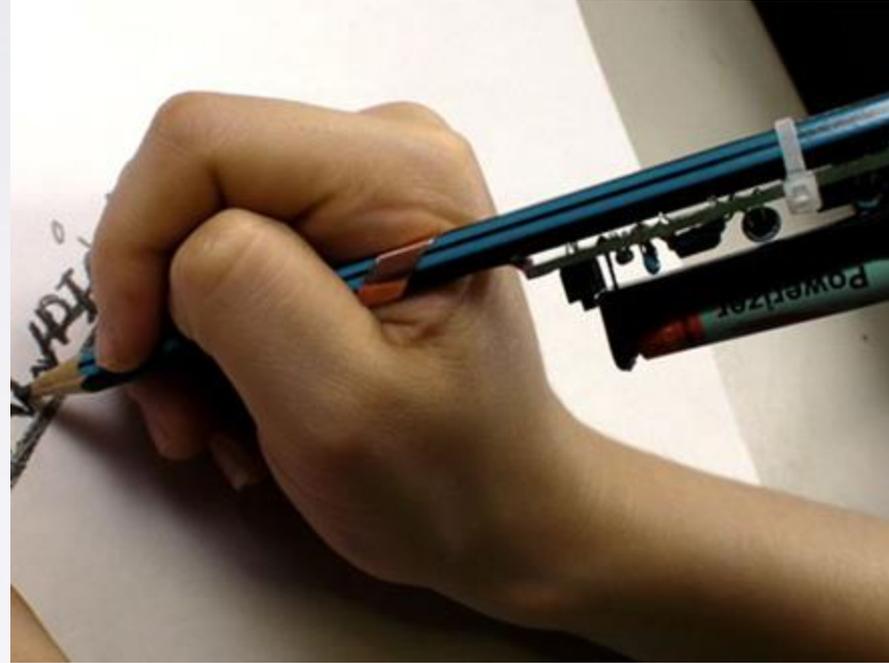
WHAT IS PLUG N PLAY?

- Smart electronics simplified by use of common connectors to make hardware more accessible to ordinary people in ways previously available only to developers.



When students create their own method of interfacing with the computer, barriers to learning and creating give way to a world of exploration that is on their terms.

Examples of PLUG N PLAY: drawdio



Imagine you could draw musical instruments on normal paper with any pencil (cheap circuit thumb-tacked on) and then play them with your finger. The Drawdio circuit-craft lets you MacGuyver your everyday objects into musical instruments: paintbrushes, macaroni, trees, grandpa, even the kitchen sink...<https://drawdio.com/>



littleBits

littleBits is a New York City-based startup that makes an open source library of modular electronics, which snap together with small magnets for prototyping and learning. The company's goal is to democratize hardware the way software and printing have been democratized.

**GET TO KNOW
YOUR BITS**

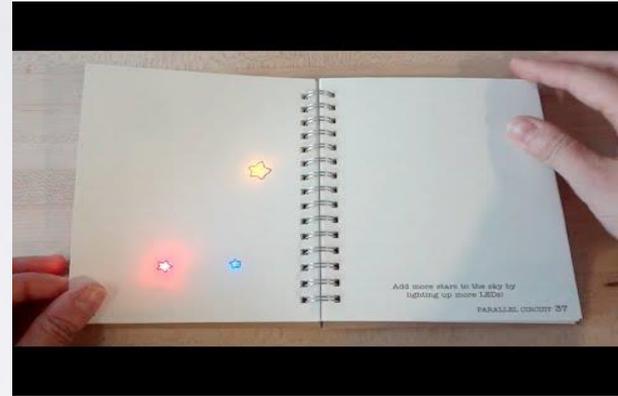
Bare conductive: Touchboard pro



<https://www.bareconductive.com/shop/interactive-wall-kit/>

CHIBITRONICS

- Chibitronics is a platform founded by Jie Qi and was developed as a part of her PhD research at MIT Media labs.
- Combines technology and art through making electronics using papercraft.
- Circuit stickers and other tools for paper circuits.

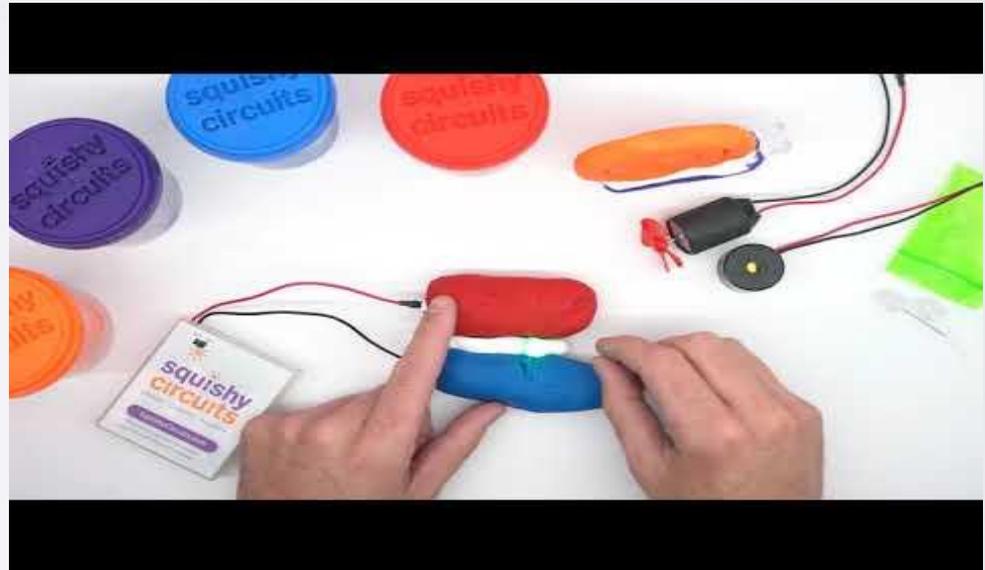


Makeymakey

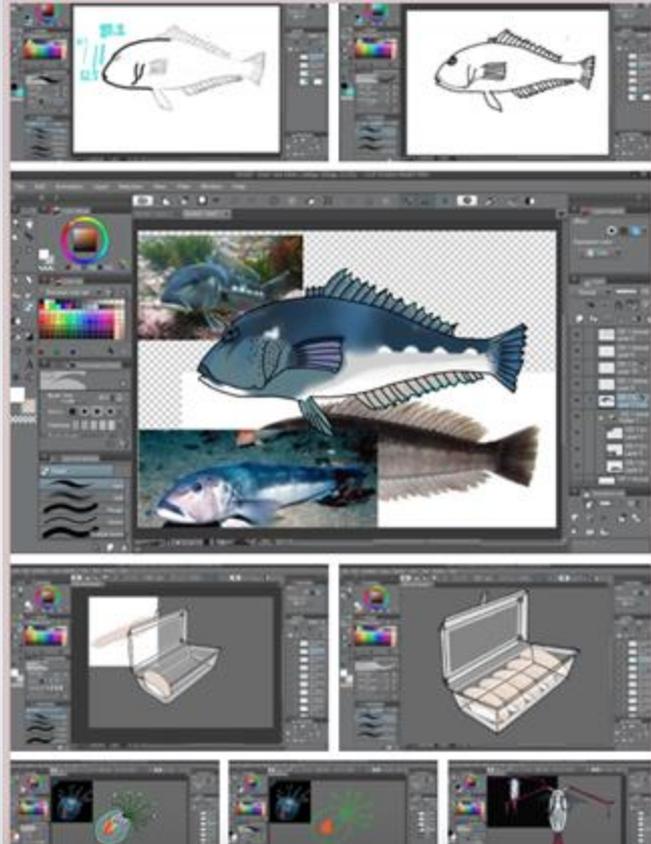


SMU President's Scholar Christian Genco uses food and technology to perform "The Star-Spangled Banner" at the SMU Talent Show on September 28, 2012. A senior computer science major, he designed this homemade musical instrument using a prototype "invention kit," assigning each piece of food and drink a particular note to play. When Christian touched each item, an open circuit was completed sending a signal to his computer to play each note. <https://makeymakey.com/>

Squishy circuits



Plastic Life Project



Bare conductive + makeymakey
Bachelor of Creative
Technology students project
about plastic waste in
our oceans.

Rachael - Screen printing

Waha - Statistics + poster

Watson - Programming/Projection

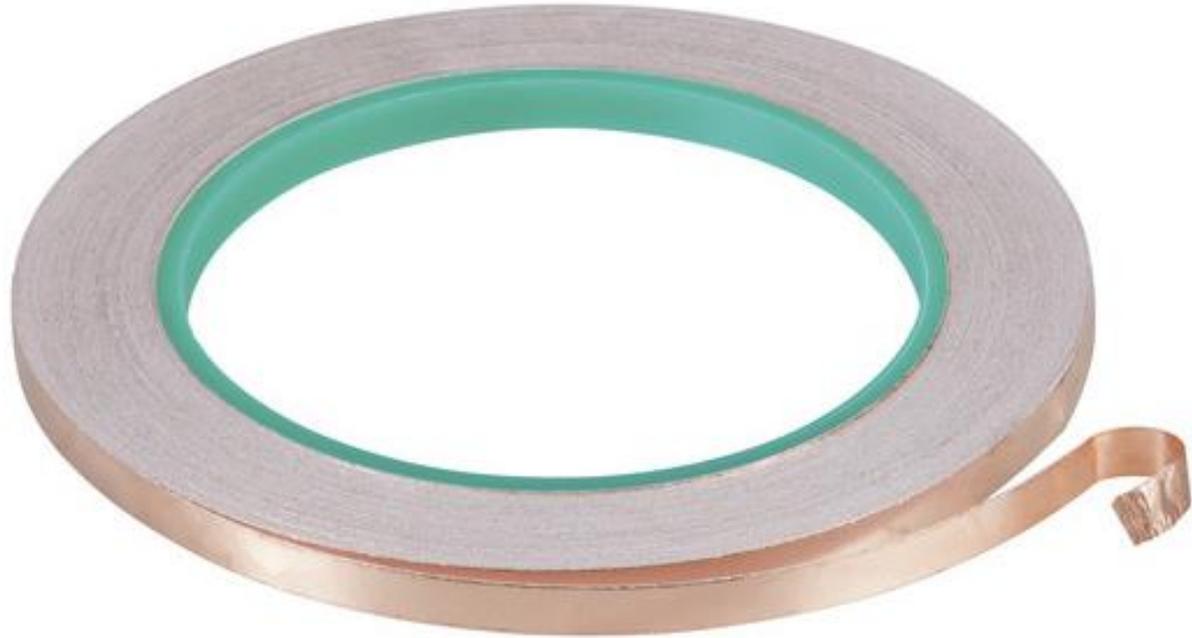
Tim - Programming/Projection

Shirley - Illustrations, Animation frames

Conductive materials for
extending creative plug in play
engagement

Copper tape

- **Conductive tape** is one of the easiest ways to get started crafting a paper circuit. Just peel off the paper backing and press down where you want your circuit to go! Copper tape is also **solderable**, allowing strong connections between components and traces that you don't get with paint and ink.



Conductive fabric tape

- Less common than copper tape is a **conductive fabric tape** made of nickel, copper and cobalt. This tape will stand up to **bending and flexing** and is a great option for projects that have folds or need movement.

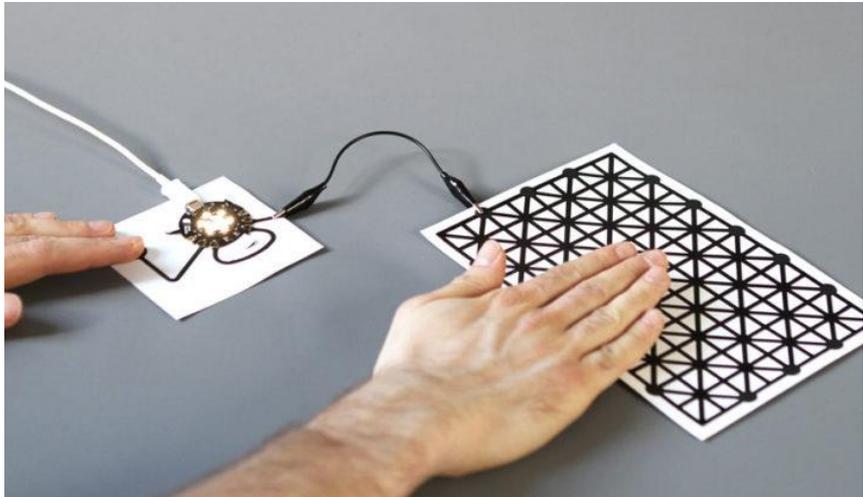


Conductive Paint

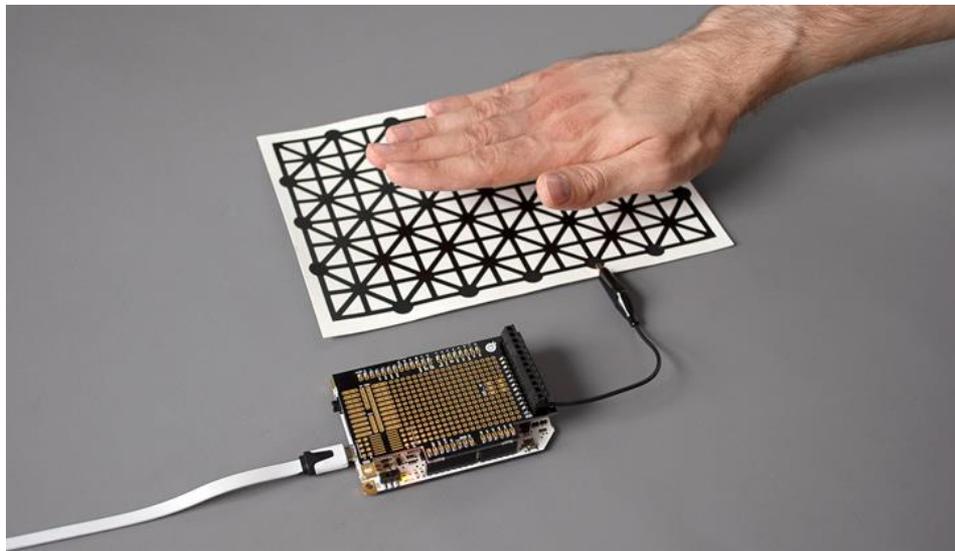
Conductive paints are a great way to create artistic pieces with electronics. Use a brush or a squeeze bottle to create traces that curve and swirl to connect components. Conductive paints can also be used to **'glue'** components to a trace. This method can be the most frustrating to use because of the mess factor and dry time. Precise traces can be made using **screen printing**. **Bare Conductives** paint is carbon based and water soluble.

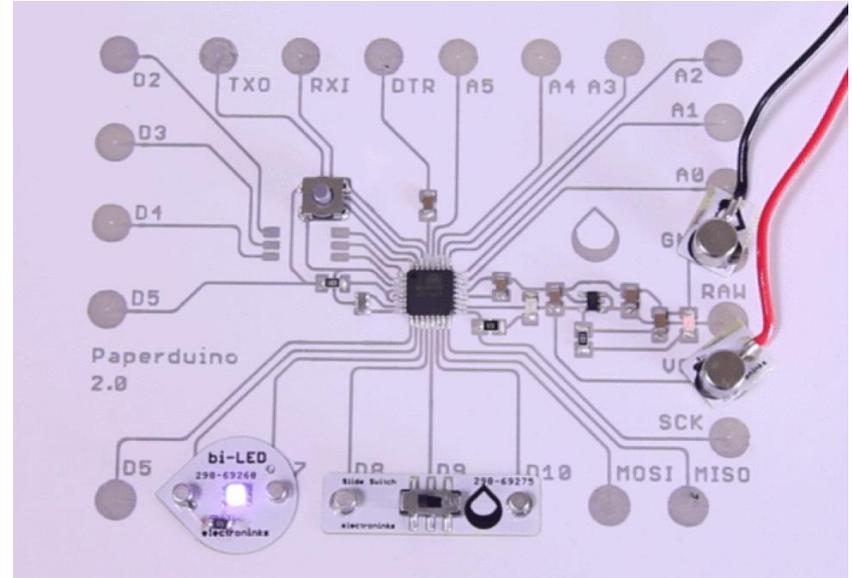


Bare Conductive



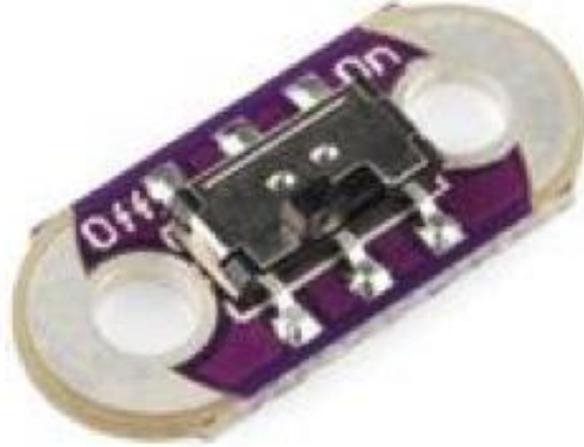
<https://www.bareconductive.com>





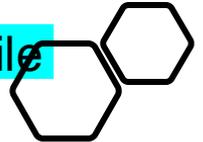
Circuit scribe pen

Circuit Scribe is a non-toxic, silver conductive ink pen that writes similarly to a gel pen. It is great for creating precise lines and drawings. Paperduino is an entire Arduino made with Circuit Scribe ink and components.



LilyPad components

Originally made for e-textile applications, LilyPad components can work well with paper circuits because of their low profile and large conductive pads. LilyPad components work best when soldered to copper tape but can also be attached using z-axis tape.



Chibitronics Circuit Stickers + Circuit Scribe Modules

Chibi stickers have a conductive adhesive on them which make them ideal for paper circuit projects. They are compatible with almost all paper circuit traces but can be expensive.

Circuit scribe are magnetic. To attach to your traces, you will need a metal surface behind your paper. A temporary connection instead of the more permanent connection. Ideal for reconfigurable artwork with the modules.



Batteries

Paper circuit projects can be easily powered with a 3V coin cell battery. You can also purchase batteries with solder tabs - these can then be soldered, glued with conductive glue.



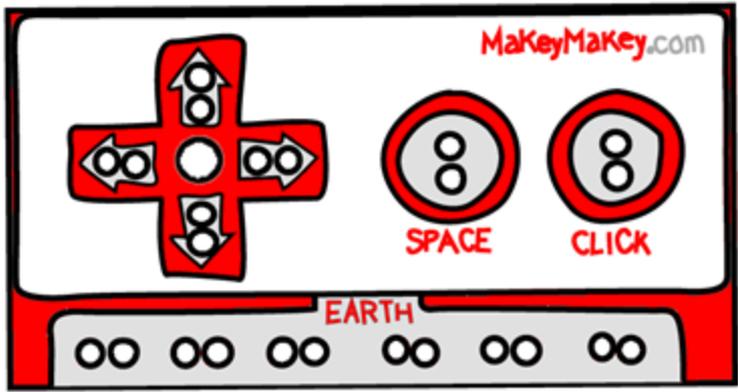
Conductive trinkets and found objects



Banana
Piano



Let's have a look at the makeymakey



Key Point #1:

The computer sees the Makey Makey as an external keyboard. The Makey Makey does not come with software to make it work with the computer nor does it need it.

Key Point #2:

If an operation on the computer screen can be controlled with the keyboard or the mouse then the Makey Makey can control it as well.

Key Point #3:

To control a function on the Makey Makey (example: Left Arrow Key) you must find a way to connect that function to “Earth” (Ground). This is called “creating a circuit”. *The most common mistake* when using the Makey Makey is to attempt to control a function on the Makey Makey without finding a way to connect that function to the “Earth” (Ground).

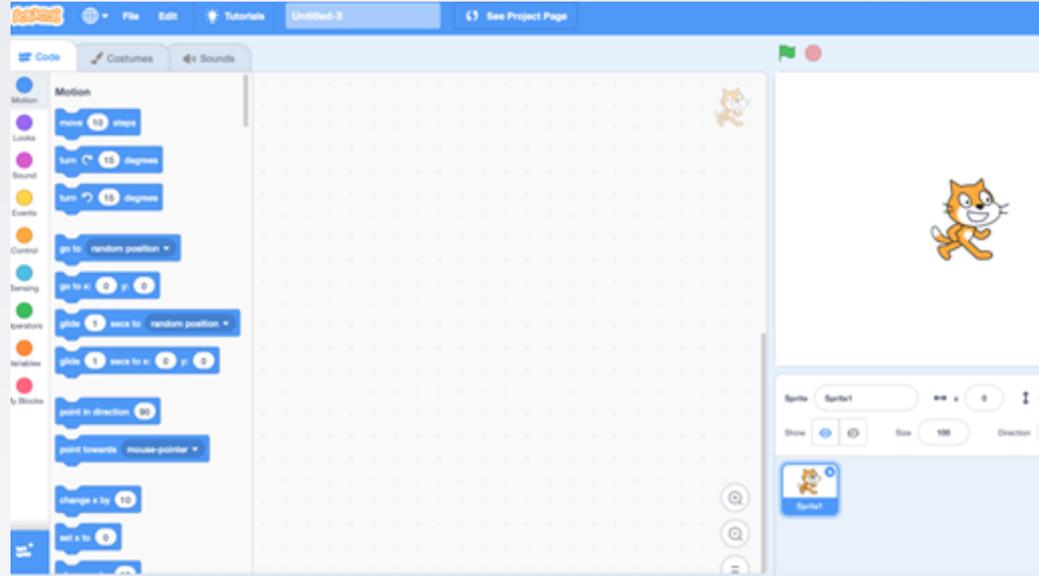
SKETCH IT PLAY IT!!!!

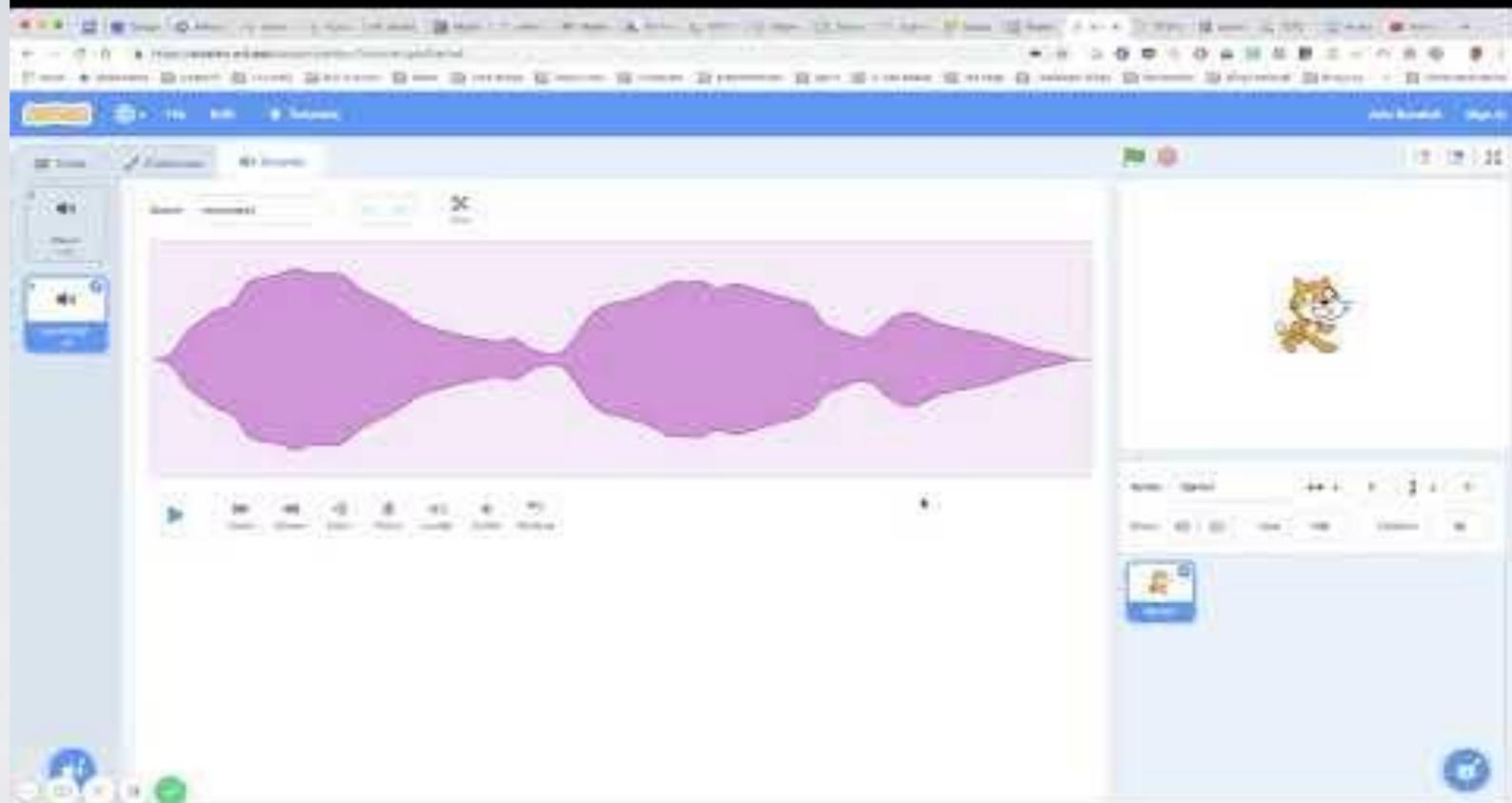




SCRATCH

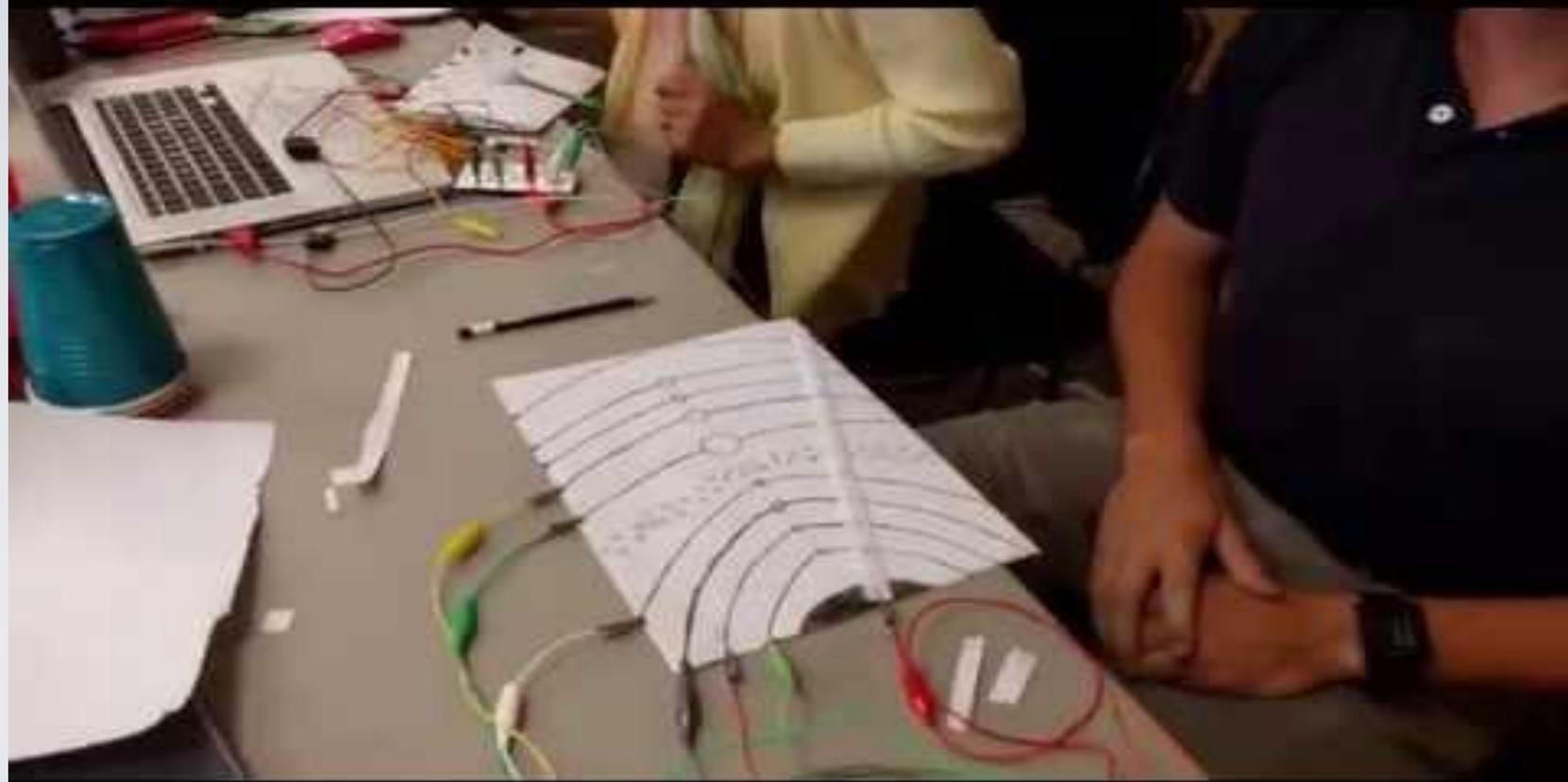
Simple coding made possible with a *free* to use program called [Scratch](#) which was developed by the [Lifelong Kindergarten Group](#) at the [MIT Media Lab](#). With Scratch, you can program your own interactive stories, games, and animations — and share your creations with others in the online community. Scratch helps young people learn to think creatively, reason systematically, and work collaboratively — essential skills for life in the 21st century. Scratch is a project of the Lifelong Kindergarten Group at the MIT Media Lab. It is provided free of charge.

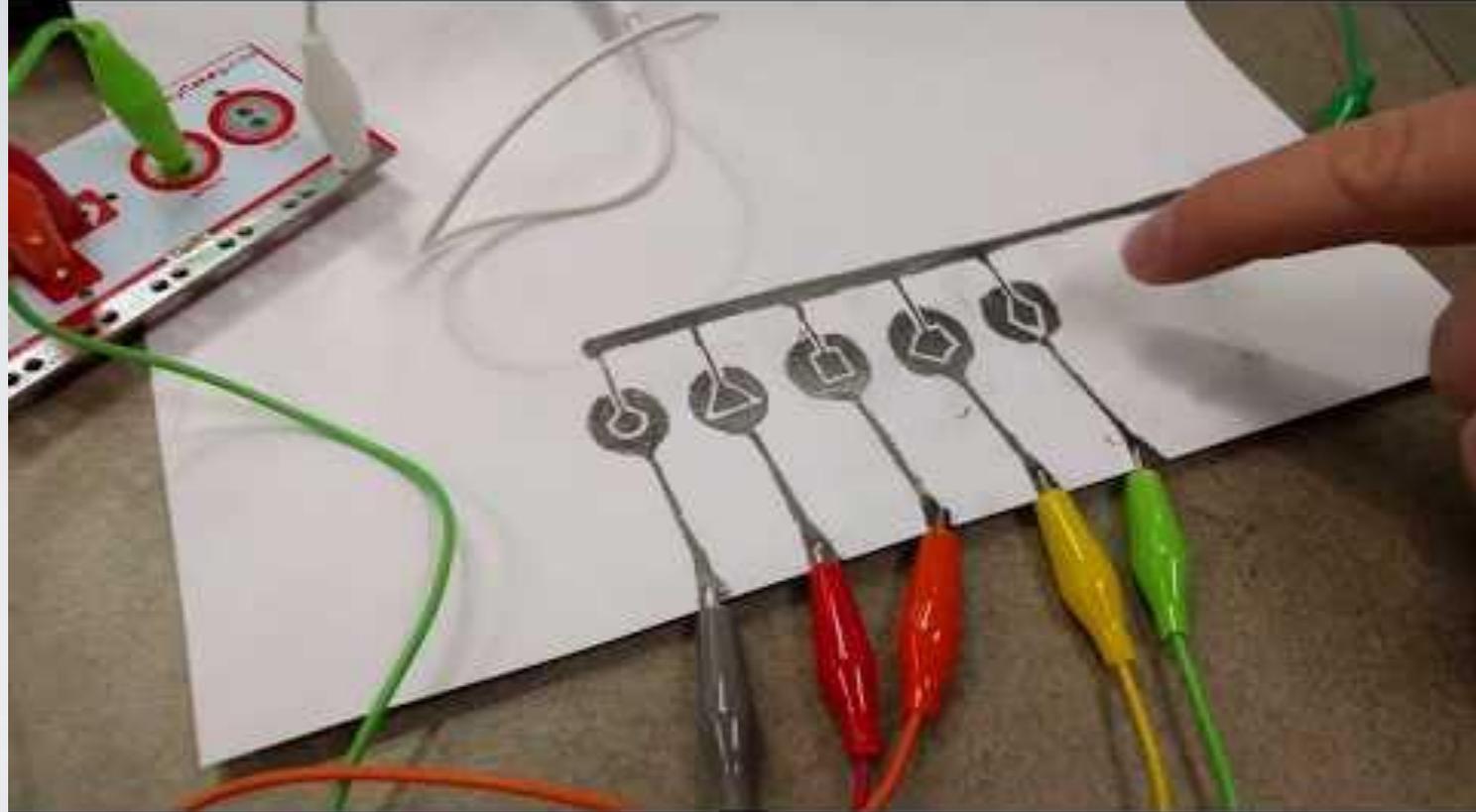




The image shows a screenshot of the Scratch programming environment. The interface is divided into several sections:

- Top Bar:** Contains the Scratch logo, a search icon, and the text "Scratch". On the right side, it says "Add Scratch" and "Sign In".
- Left Panel (Sprite Area):** Displays a vertical list of blocks categorized by color: blue (Motion), purple (Looks), pink (Sound), yellow (Cycles), orange (Control), light blue (Logic), green (Media), red (Sensing), and brown (Communication). Below these are "Motion" and "Looks" block categories.
- Script Area (Center):** Contains a script for a sprite. It starts with a yellow "When green flag clicked" block, followed by three purple "say" blocks. Each "say" block has a text input field containing "Hello, my name is Scratch!" and a duration of 2 seconds.
- Stage (Right):** Shows a white background with a single orange cat sprite in the center.
- Chat Area (Bottom Right):** Features a text input field with a "Send" button and a blue speech bubble icon.







J . Views playing teardrop with vegetables (massive attack)



Beau Silver created The world premiere of the Bananamophone . This is a recording of a rehearsal. Created using a MakeyMakey circuit. For those of you interested in how he hooked up Makey Makey to MIDI, he hooked up keyboard presses to MIDI, and then having Makey Makey trigger keyboard presses.



Studying BCT- look at our student's
digital showcase

<https://futureenvironments.aut.ac.nz/>

E textiles workshop –attend an e-textiles
workshop

<https://tdl.aut.ac.nz/short-courses/e-textile>

Resources for creating with the MakeyMakey and other plug and play devices