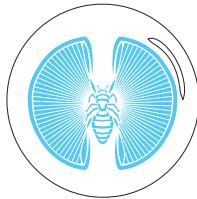
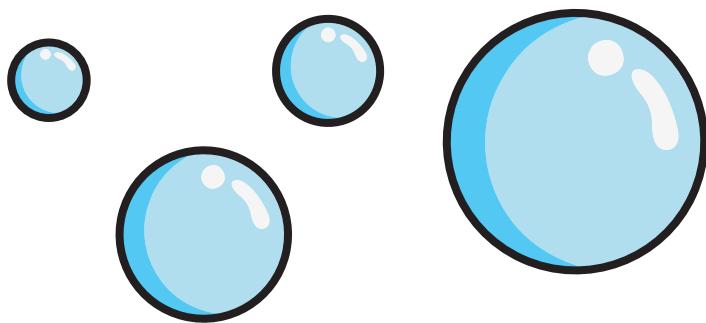


# BUBBLE PUNK





# DIGITAL NATURALISM LABORATORIES

Bubblepunk Zine created on free/pirated technology.

Created by Dr. Andrew Quitmeyer, Edited by Kitty Quitmeyer  
Digital Naturalism Laboratories - Gamboa, Panama  
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# PUNK

IS ABOUT

# SHARING FREEDOM

## PUNK LEVEL

QUITE  
PUNK

EVEN MORE  
PUNK

MOST  
PUNK

## DESCRIPTION

Getting stuff  
for free!

Sharing stuff freely  
with others!

Liberating things  
locked up so  
others can share  
even more!

\*Beware people and groups that appropriate the word "freedom" to mean the freedom to take the freedom from others. They suck. They are Fascists, not Punk.

# BUBBLES

ARE CLOSE TO MAGIC  
YET ANYONE CAN MAKE THEM

Our lab is in a strange town called Gamboa, Panama.

It's the semi-abandoned former HQ of the Panama Canal. Massive ships float by while howler monkeys play in the rainforest on the other side of town. Agouties scamper along the streets, and scientists emerge from the forest with odd contraptions while animal rescue vans collect special leaves to feed hungry tapirs and sloths.

But Gamboa's also become a sort of instagram hotspot. People come to celebrate things like quinceaneras and/or governmental parades. This means about every weekend people come with plastic balloons and plastic confetti.

Even the most conscientious groups will accidentally lose bits of garbage in this nice nature.

I love the fun, but I hate the trash. So my goal became to try to make bubbles **SO POPULAR** that people will celebrate with them instead of making more trash!



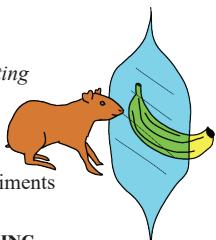
# Mixed Material Globules in Research, or She (Acoustically) Blinded Me (a Dolphin) with Science (Bubbles)

A. Quitmeyer<sup>1</sup>, V. Tapir<sup>2</sup>, L. Agouti<sup>2</sup>, S. Hub<sup>3</sup>

1. Digital Naturalism Laboratories, Institute for Advance Jungle Crafting

2. Panamerican Association for Animal Conservation

3. Sci-Hub - Science's Greatest Liberator ([www.sci-hub.st](http://www.sci-hub.st))



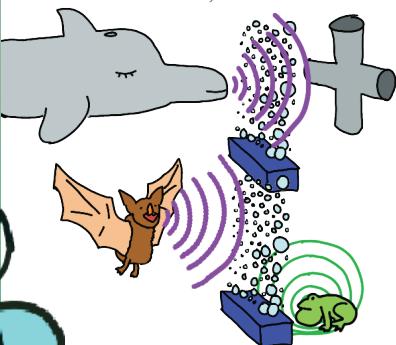
**Abstract** - *Bubbles are pretty cool. They provide novel soft-interfaces with nature.*

## 1 INTRODUCTION

Scientifically, bubbles are simply globules of substances located within other substances. These thin borders between one material and another create interesting effects like refraction and internal reflection. The softness, ephemerality, and lightness of bubbles allows us to use them to interact with the world in unique ways.

## 1 BUBBLE CURTAINS

Bubbles can form soft barriers that interfere with the way that waveforms pass through them. Dolphin researchers use bubble curtains to test dolphin senses. Bubbles can be turned on and off to acoustically hide an object and prevent the creatures from using their sonar abilities[1]. We are curious to see how bubbles might be used in behavioral experiments with creatures that can also echolocate, like bats!



Underwater, bubbles block sound because there is a large difference in density between air and water, and it makes sound waves reflect. Researchers use bubble curtains to surround underwater machinery to mitigate noise pollution in the ocean[2]. However, in air, bubbles might not block echolocation, but could be interesting soft-barriers to test foraging abilities of jungle creatures. We will have to find out!

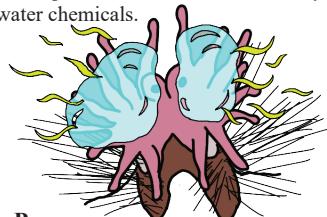
## 2 BUBBLE WALLS

Physicists create stable, self-sustaining bubble films for micro-fluidics research. These same bubble walls could be used to create temporary

barriers in behavioral experiments

## 3 UNDERWATER SMELLING

Biologists recently discovered that mammals, like star-nosed moles, can smell underwater by creating bubbles on their noses that allow scents to diffuse into the air[4]. We could potentially use cheap gas sensors paired with bubbles to similarly sense underwater chemicals.



## 4 BUBBLE POLLINATION

Researchers discovered a new way of artificially pollinating large fields of flowers efficiently. Mixing pollen with bubble fluid and dispersing via a drone-mounted bubble machine helped pollinate as effectively as by hand[5].

## 5 REFERENCES

[1] (Open Access!) Vishnu, H., Hoffmann-Kuhnt, M., Chitre, M. et al. A dolphin-inspired compact sonar for underwater acoustic imaging. *Commun Eng* 1, 10 (2022). <https://doi.org/10.1038/s44172-022-00010-x>

[2] Würsig, B., C. R. Greene Jr, and T. A. Jefferson. "Development of an air bubble curtain to reduce underwater noise of percussive piling." *Marine environmental research* 49.1 (2000): 79-93.

[3] Salkin, Louis, et al. "Generating soap bubbles by blowing on soap films." *Physical review letters* 116.7 (2016): 077801.

[4] Catania, K. Underwater 'sniffing' by semi-aquatic mammals. *Nature* 444, 1024–1025 (2006). <https://doi.org/10.1038/4441024a>

[5] (Open Access!) Xi Yang, Eijiro Miyako, Soap Bubble Pollination, *iScience*, Volume 23, Issue 6, 2020, 101188, ISSN 2589-0042, <https://doi.org/10.1016/j.isci.2020.101188>



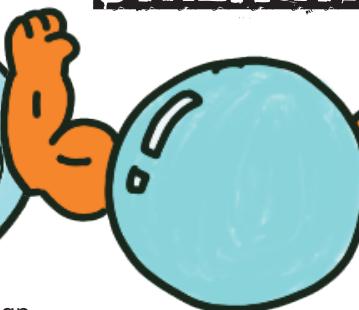
# BUBBLE RECIPES

There are 3 components to making good bubble solution

**FOAM**



**STRENGTH**



**LONGEVITY**



**SURFACTANTS**, like soap, help liquids foam. SLS is a technically edible surfactant.

**LONG POLYMERS** help bubbles resist pokes and bumps (but make bubbles heavier).

**MOISTURIZERS** stop water from evaporating, extending the lifespan of the bubbles.

## SCIENCE RECIPE

A group of scientists proposed this recipe as the best way to create stable bubbles for scientists and artists.

- 40mL Dish Washing Liquid
- 100mL Glycerol/Glycerine
- 1g Guar Gum / Xanthan/ Sugar

Pasquet, M., Wallon, L., Fusier, PY. et al. An optimized recipe for making giant bubbles. Eur. Phys. J. E 45, 101 (2022). <https://doi.org/10.1140/epje/s10189-022-00255-6>

## SEXY RECIPE

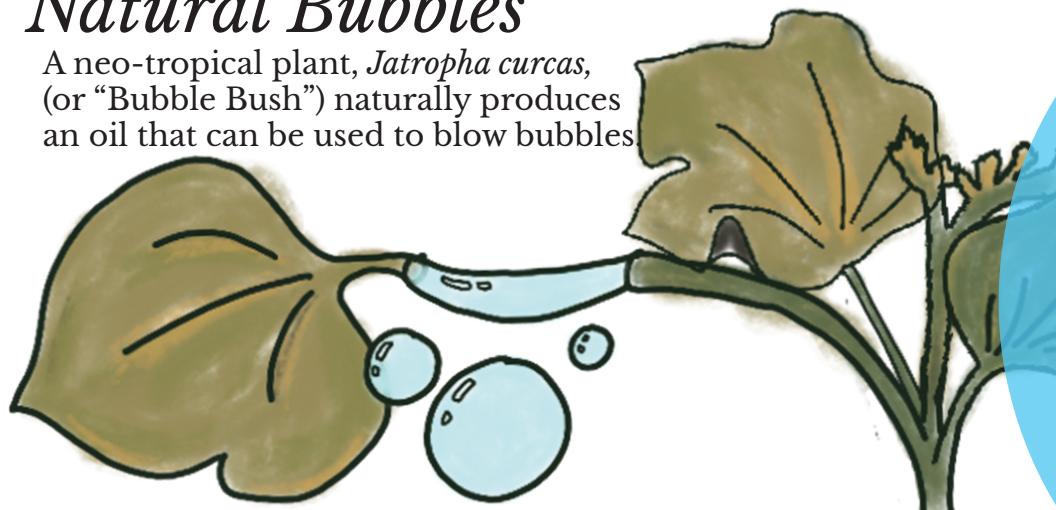
Bubble Photographer, Emily Wick, has an alternate recipe that is easy to follow and strong for giant, picturesque bubbles. Lube (like J-Lube powder) contains propylene glycol which is like a lightweight form of glycerine.

- Spoonful of Waterbased Lube
- Add Dish Liquid until bubbles show full range of colors (not enough and they are only amber and blue)

Wick, E. <https://emilywick.com/>

## Natural Bubbles

A neo-tropical plant, *Jatropha curcas*, (or “Bubble Bush”) naturally produces an oil that can be used to blow bubbles



# BUBBLE WANDS

FUNDAMENTAL  
BUBBLING

MAIN HOLE should be big enough to make good bubbles (too many tiny holes make foam instead)

GROOVES help hold more liquid and ease the surface tension for making more and larger bubbles.

HILT can keep your hands cleaner

HANDLE has extra hole for grip (and bonus bubbling)

**BUBBLE WANDS** are fun to design in any shape you want!

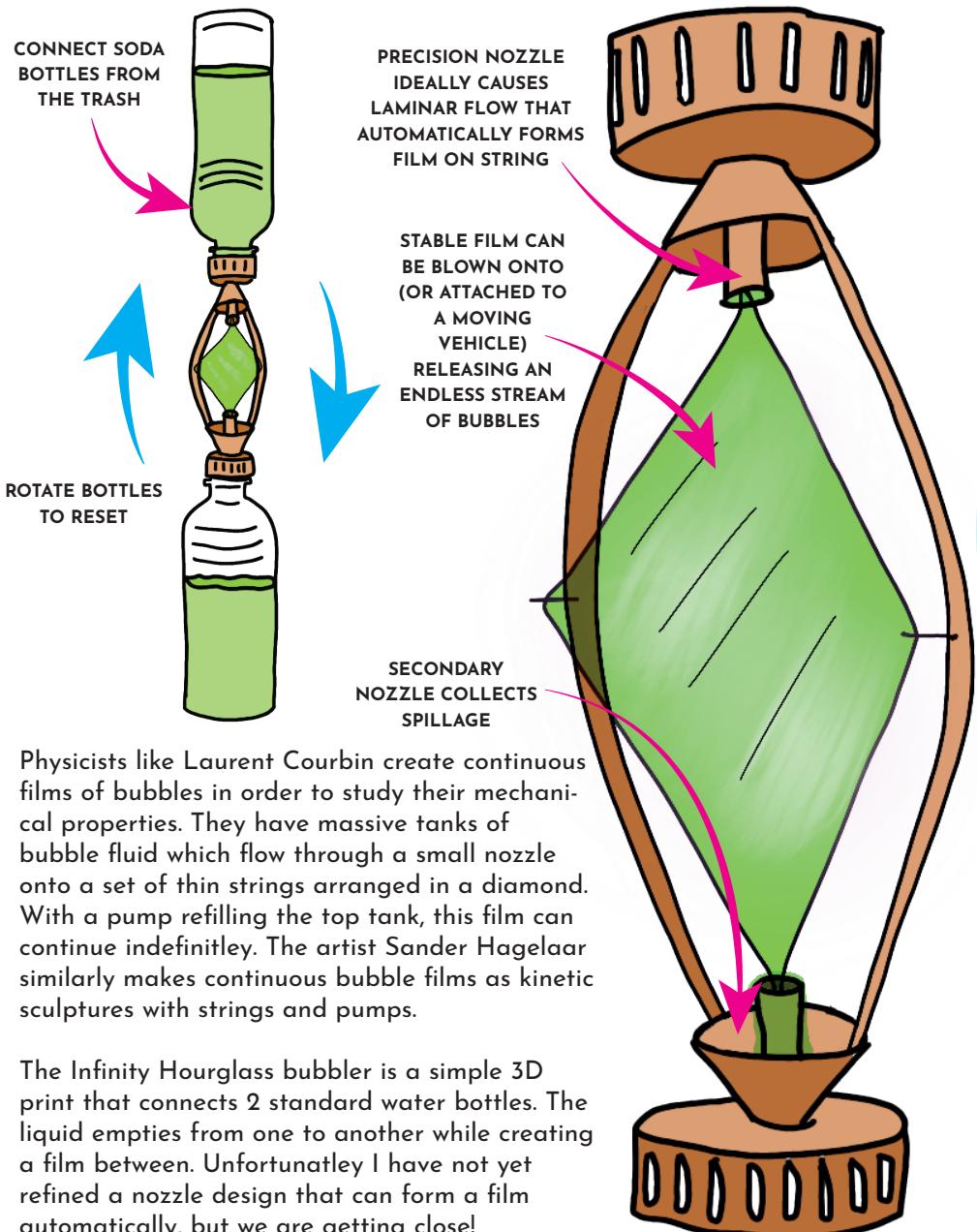
They can be 3D-printed, Laser cut, moulded, hand-carved, or even drawn with cheap 3d printing pens!

(Ours are 3D printed from old plastic bottles!)

# SOLID STATE BUBBLER

## THE INFINITY BUBBLER

Most bubble devices need to be dipped into a liquid to create the film. I wanted to design a continuous bubble making machine with **NO MOVING PARTS**. We have a device that's almost there!



# ACTIVIST TECHNOLOGY

Bubble-tech could provide useful tools for non-violent interventions against oppressive forces. Here's some theoretical ideas.

INKS CAN BE MIXED WITH BUBBLE FLUID TO MAKE LARGE-SCALE ART

INDOOR SPACES CAN BE DISRUPTIVELY FILLED WITH BUBBLES IN 4 SECONDS

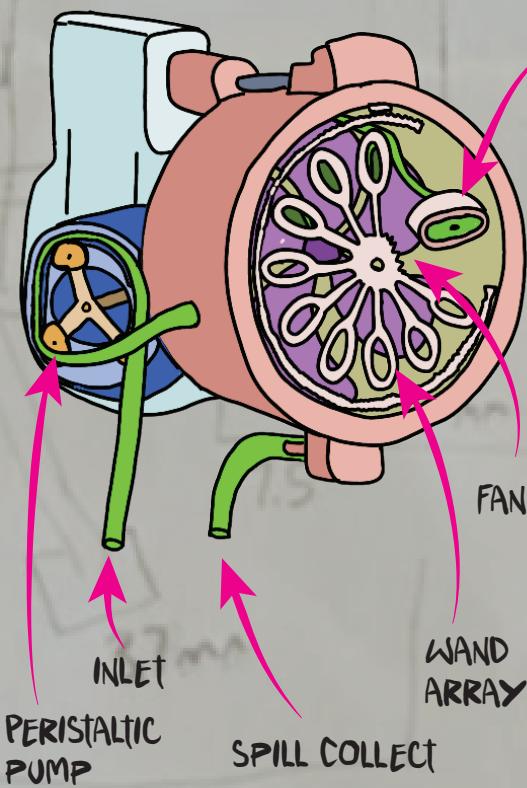
OUTDOOR PROTESTS CAN HIGHLIGHT PEACEFUL ACTIONS WHILE INTERFERING WITH OPPRESIVE KETTLERS

# THE REVOLUTIONARY BUBBLE NIPPLE

Traditional bubble machines were pretty straightforward. A set of bubble wands rotates through a bath of bubble solution and a fan blows on the wands as they pass. These machines are **CUMBERSOME**, easy to get **DIRTY**, **POWER-HUNGRY**, and easy to **SPILL**. This makes them quite **STATIONARY**.



## BUT THERE'S BEEN AN INNOVATION IN BUBBLE BLASTERS!



Instead of an open bath of bubble fluid, many new toys pump solution to a **BUBBLE NIPPLE!**

Liquid is drawn from an enclosed bottle using a built-in peristaltic pump, and sent to the nipple where a miniscus of liquid is formed. The passing wands wipe the surface of the nipple creating a perfect film that is blown into a bubble. In these machines, the moving parts (pump, fan, and wands) are all driven by a single motor.

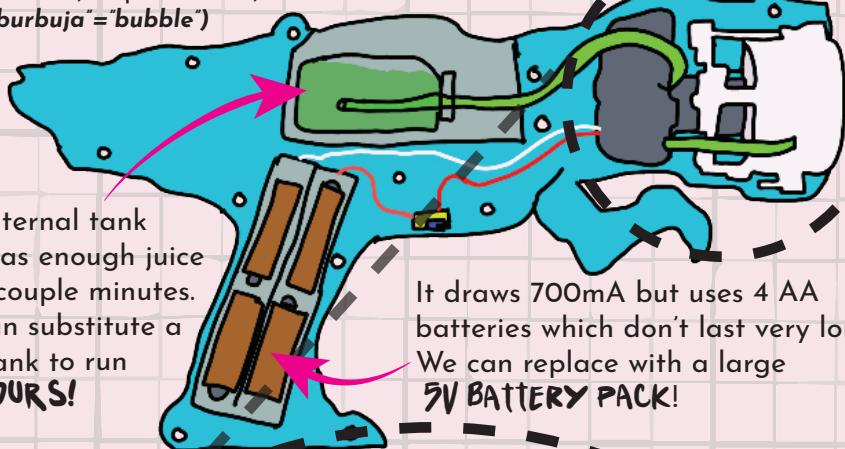
These machines are **CLEAN**, **EFFICIENT**, and **MOBILE!** (and ready for **BURBUJACKING!**)

# Burbujacking a Standard Dinosaur Bubbler

These cheap toys pack an awesome bubble module!

Just unscrew, snip the wires, and extract the module

(btw 'burbuja' = "bubble")



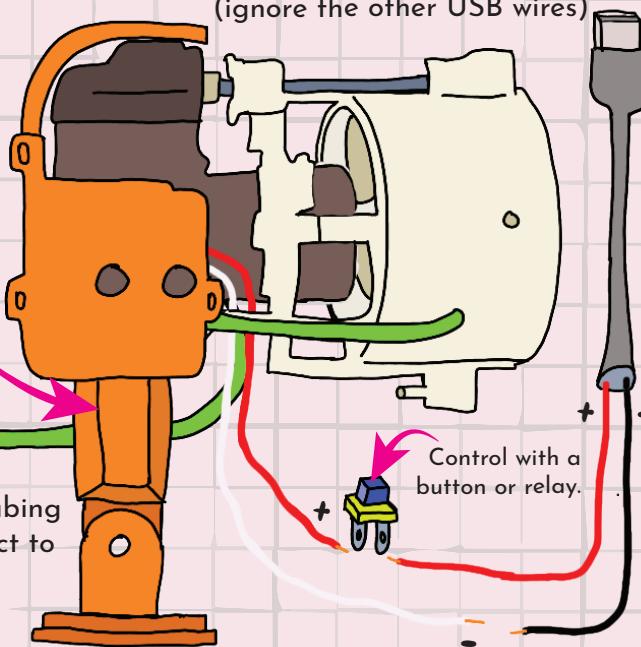
The internal tank only has enough juice for a couple minutes. We can substitute a new tank to run for  **HOURS!**

It draws 700mA but uses 4 AA batteries which don't last very long. We can replace with a large  **5V BATTERY PACK!**

Simply hack a USB cable and connect its RED and BLACK wires to the + and - wires of the module.  
(ignore the other USB wires)

3D printed holster has GoPro mount to connect to anything!

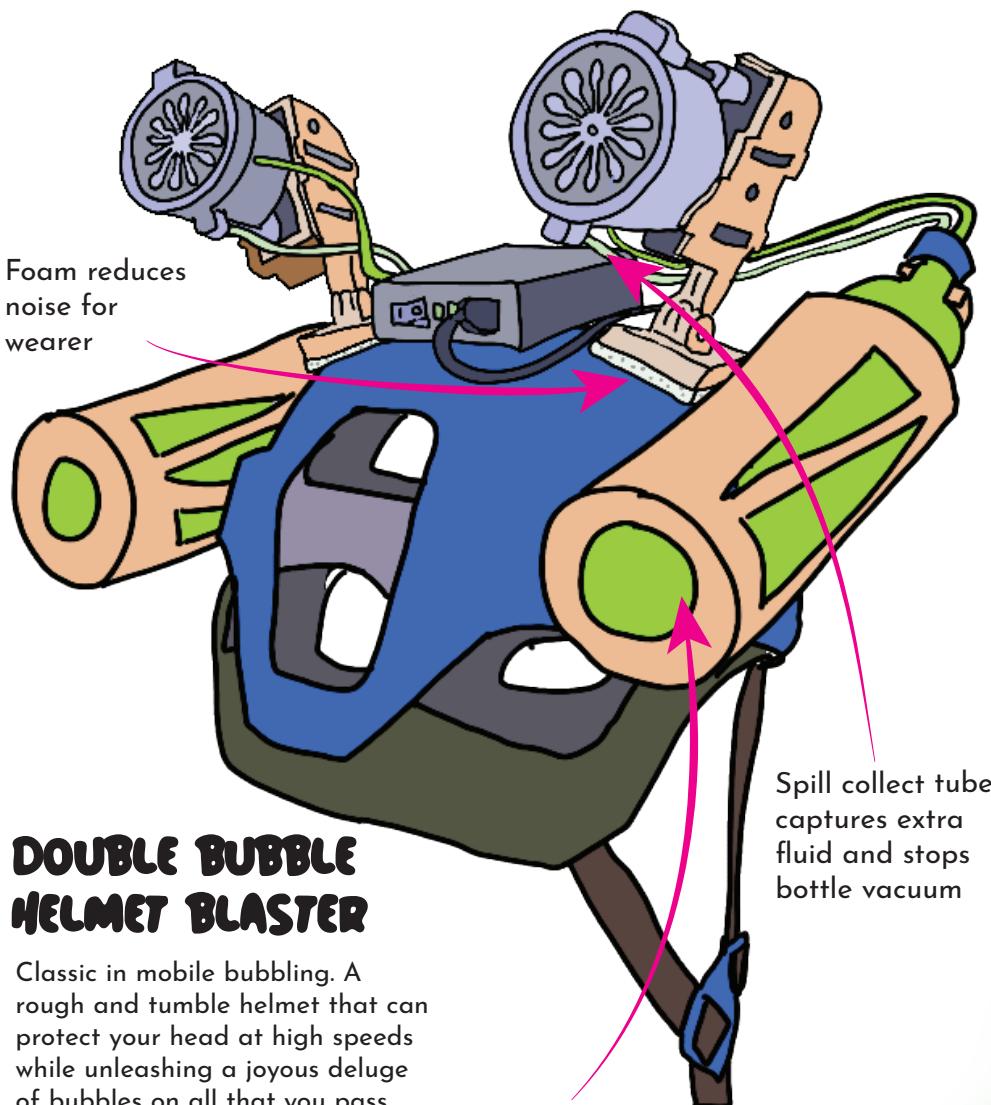
1/8in ID tubing will connect to the inlet.



Connect your tubing to any bottle you want!  
Drill a hole in the lid, and slide the tube in.  
A 1 liter bottle can last 3 hours!

# WEARABLE BUBBLERS

Once your bubble modules are free of their toy prison, the bubblebilities are endless!



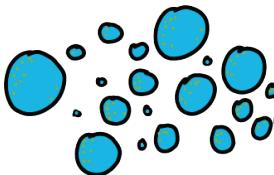
## DOUBLE BUBBLE HELMET BLASTER

Classic in mobile bubbling. A rough and tumble helmet that can protect your head at high speeds while unleashing a joyous deluge of bubbles on all that you pass. The two-parallel bubble modules mean that if one breaks, you can keep bubbling! A small 3000mAh phone charger can keep this thing running for almost 5 hours!

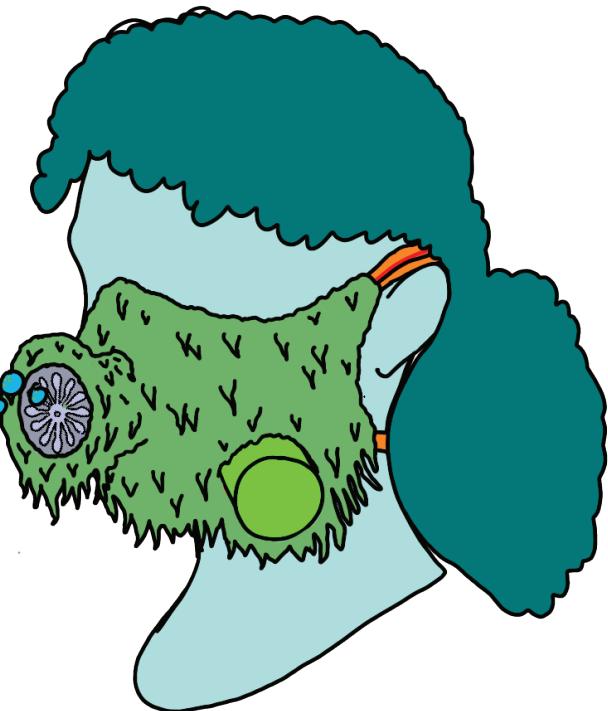
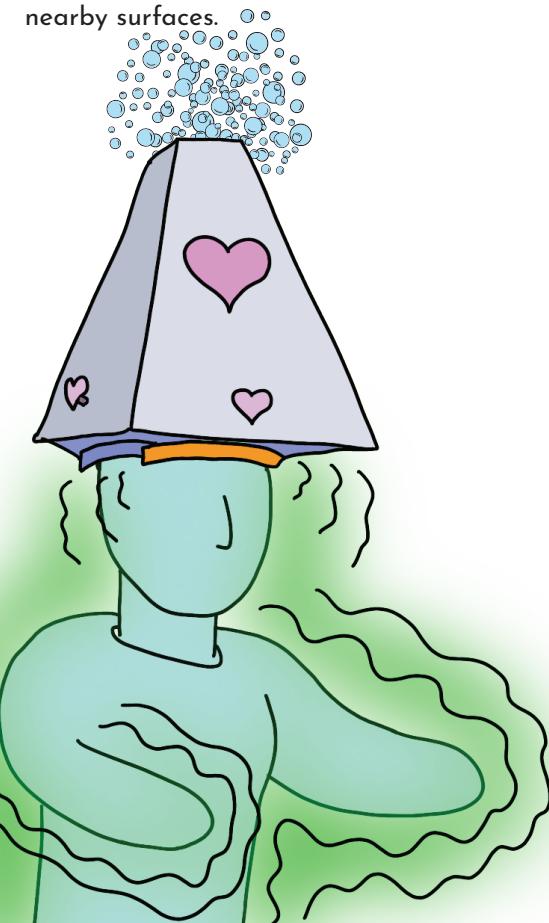
3D print the holsters, and then simply zip-tie the battery, bottles, and bubble modules to your helmet.

# MOSS BREATH BUBBLE MASK

Combines ideas from a NYU workshop, "Thinking With Moss" and the bubble pollination paper.



Leptolejeunea moss (actually a liverwort) is ground up in a low-soap solution. A temperature sensor in the mask detects breathing, and **BLOWS BUBBLES OF MOSS** to colonize other nearby surfaces.



# LOVE BUBBLER

Originally created for the Panamanian queer activist group, SalvaElGrillo ([salvaeelgrillo.org](http://salvaeelgrillo.org))'s Queer Valentine's Picnic.

An Arduino and transistor control the bubble module inside. The device is programmed with a 1-wire ADC cap touch sensor that connects to the wearer's forehead. This turns their entire body into a capacitive antenna.

When their electromagnetic field is significantly altered (such as when hugging someone or a large plant like a tree), the machine will light up the glowing heart, and trigger the bubble module to share the bubble-love.

# FLOATY FOAM

15  
15

Want the ability to have something that floats and can look like a specific shape? You don't need a garbage-y mylar balloon, you just need to make FLOATY FOAM!

You get a box full of bubble solution which you bubble a fine mist of light-air through. This creates a thick foam. Put a lid on the foam with your shape cut out, and the foam will bubble through taking its shape! Slice it off with a thin wire, and your shape will float into the heavens!

NOTE: Helium is a scarce resource! You could use Hydrogen instead (the foam can be lit on fire!), or for a safe alternative maybe one could try hot air or hot water? Would that work? or would it cool too quick? I don't know, try it out!



## PREPARE THE HOSE

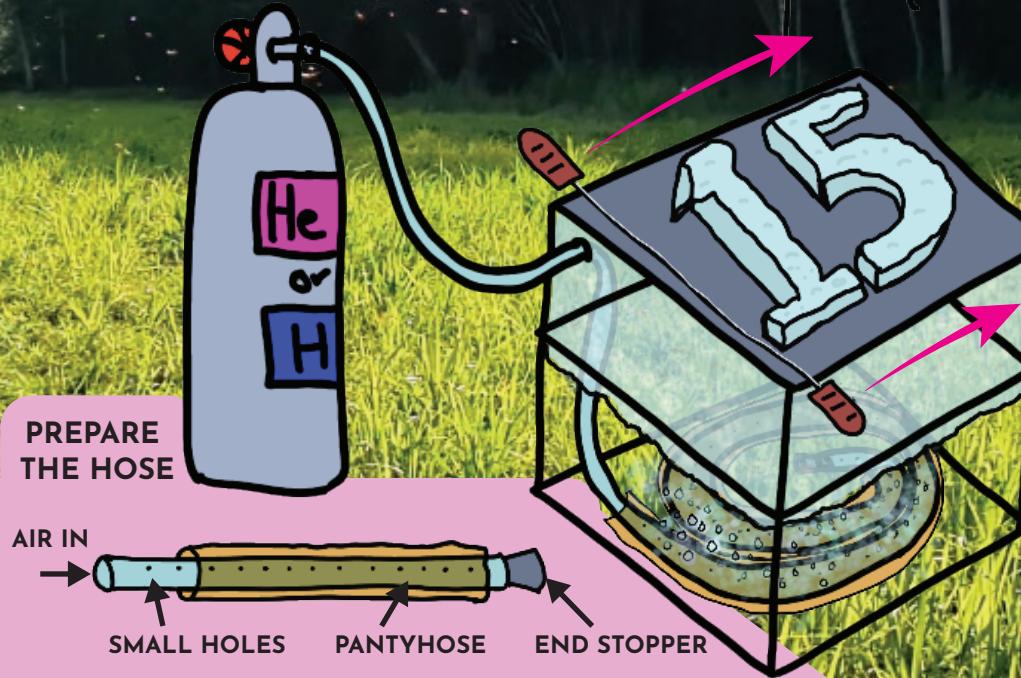
AIR IN



SMALL HOLES

PANTYHOSE

END STOPPER



# GALLERY



Earliest Bubble-Helmet: "Trash Bubbler"  
made from upcycled garbage.



First bubble blasters hacked: Dino and  
Snow Princess Bubblers



Bubble-Blading along the Panama Canal



The band Lemmiwinks using an early  
bubble helmet to bubble up their  
performance



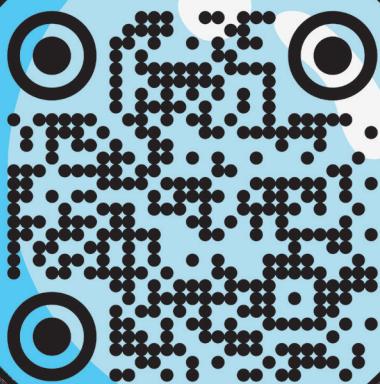
Upcycled 3D printed Bubble Wands



LGBTQ+ Activist Group, Salva El Grillo's  
Queer Bubble Picnic with Love Bubble Helmet



BUBBLE  
PUNK



[WWW.DINALAB.NET/BUBBLEPUNK](http://WWW.DINALAB.NET/BUBBLEPUNK)