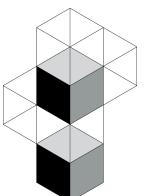
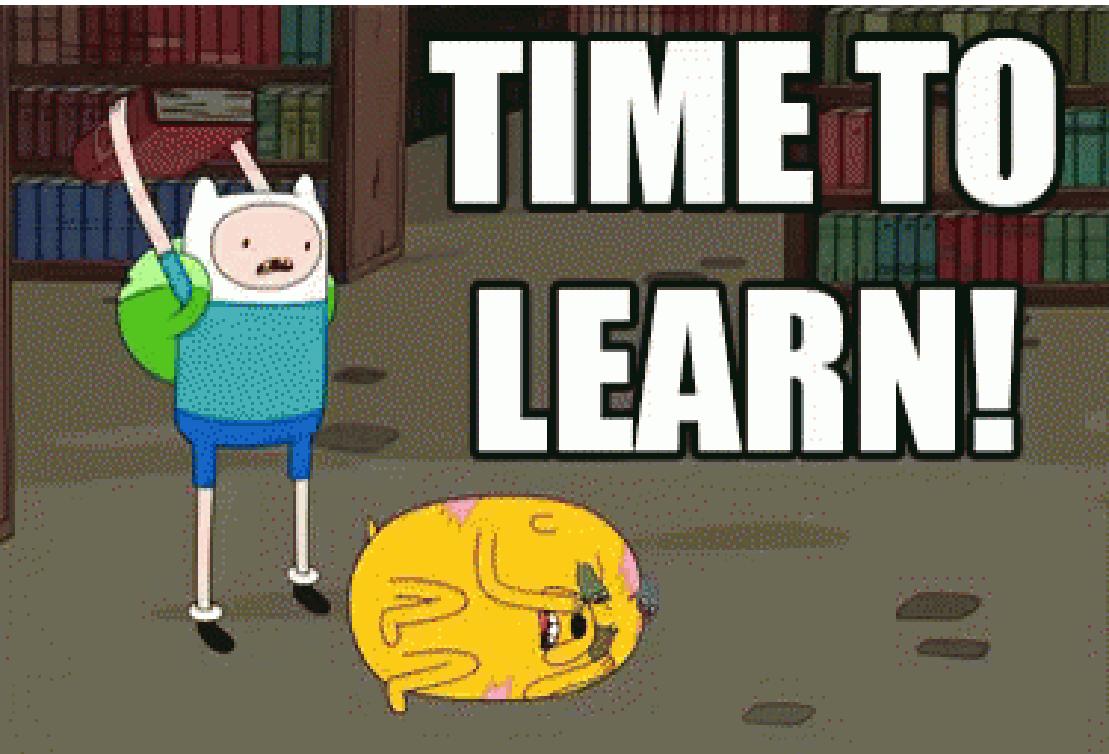
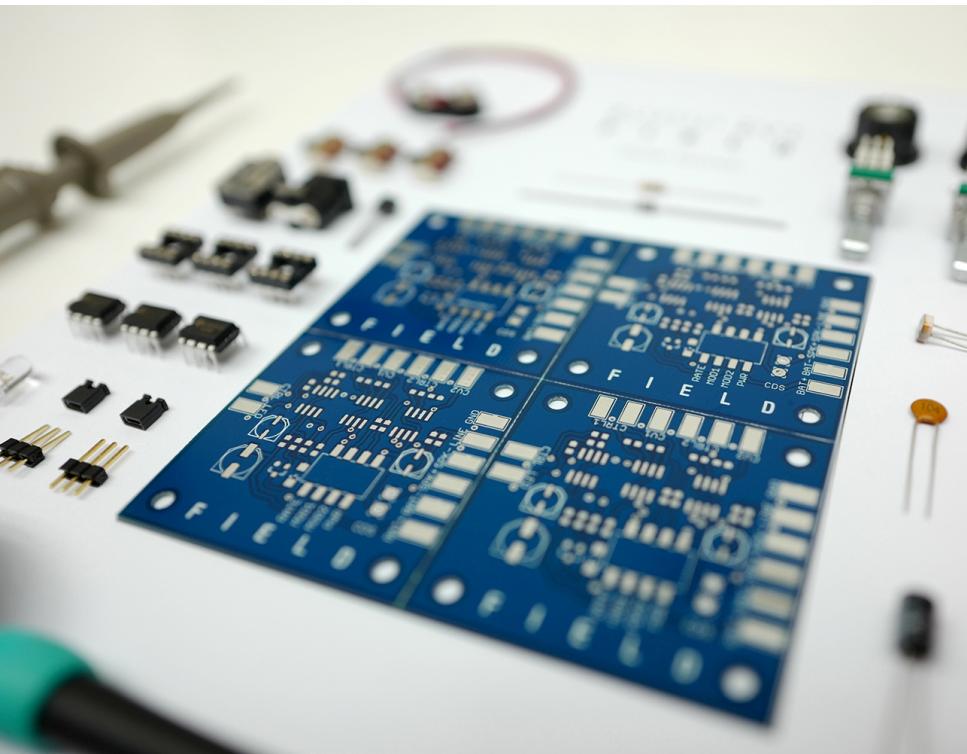


The Urban Organism

@35c3



Pt.1:

Idiosyncrasies of the Metropolis

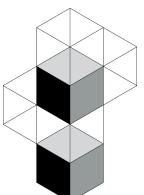
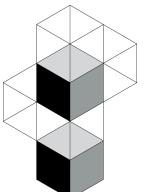




Image: (The photographer is believed to be deceased since image was taken in the 1800s, Image from Book old Hong Kong by Trea Wiltshire)

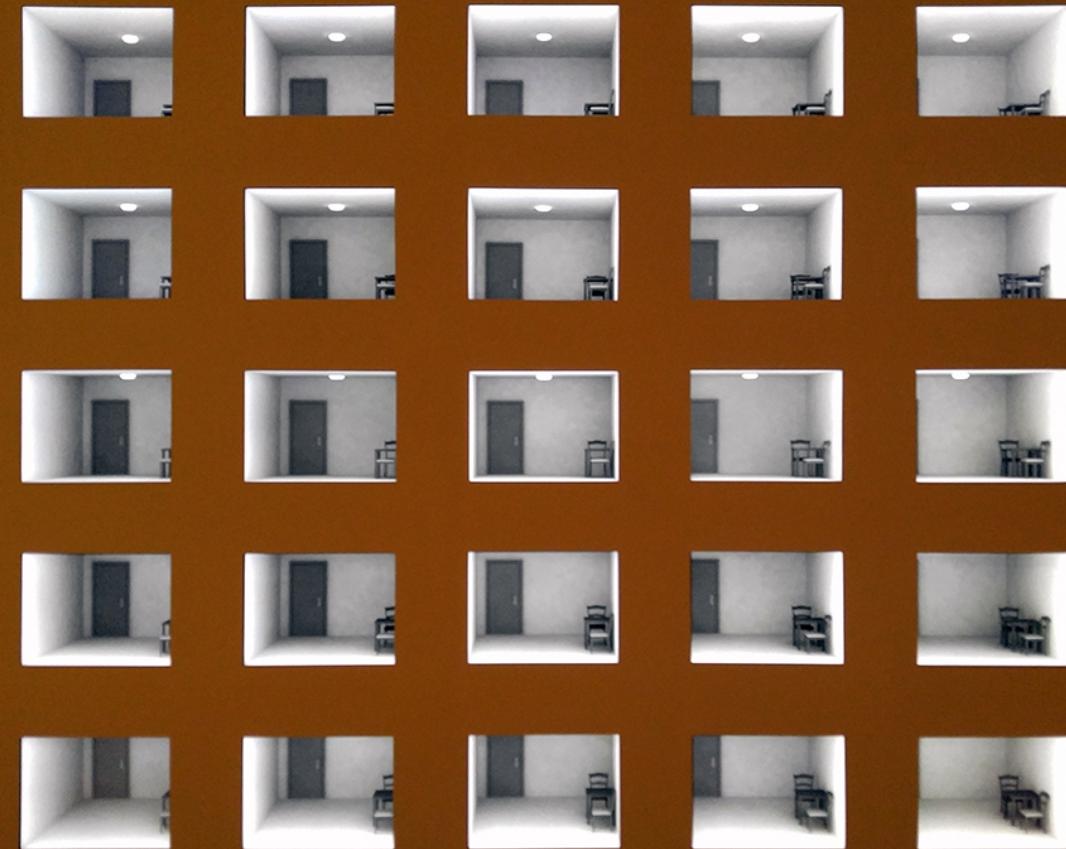
Source:

By See above, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=6919488>



Left: Author's photograph of "The Room (Surveillance I)", 2006/2017 by artist Leandro Erlich.

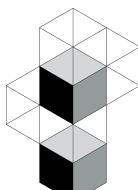
The caption, displayed at the Mori Art Museum (Tokyo), indicates "25 monitors [...] table, two chairs and single door, nothing happens and no one enters. What is being examined here [...] would seem to be pointless [...] mass surveillance has actually been a fact of life for some time".



Right: Typical high-rise structures in Hong Kong, striking resemblance to the image left.

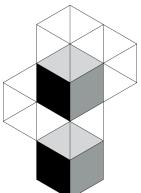
Source:

Janko Luin/Flickr (flickr.com/photos/jluin/6601386971/) "Population Density"





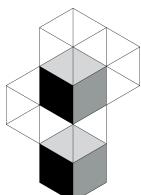
1. Proximity to Chinese manufacturers; 2. Culturally-Accessible; 3. Stimuli



Video 1

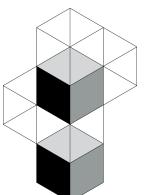
Source:

Vicente, Miguel. "Hong Kong timelapse", <https://vimeo.com/74124193>. (mvgfoto.com)



Pt.2:

Collaboration and Peer-Production





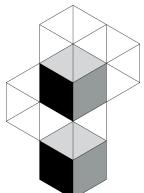
Top Left: Shielding from tear gas at the Umbrella Revolution, Hong Kong, 2014.
"Hong Kong Umbrella Revolution", (flickr.com/photos/studiokanu/15327905238/) CC-BY 2.0

Bottom Left: Pasu Au Yeung - "Hong Kong Umbrella Revolution #umbrellarevolution
#UmbrellaMovement"
(flickr.com/photos/29418416@N08/15327905238) CC-BY 2.0

Above: Pasu Au Yeung - "Umbrella Revolution in Admiralty Night View"
(flickr.com/photos/studiokanu/15497439065/) CC-BY-SA 2.0

Video 2

Source:
Author's video. "Termites".



Dim Sum Labs - Hong Kong's First and Only Hackerspace



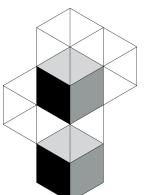
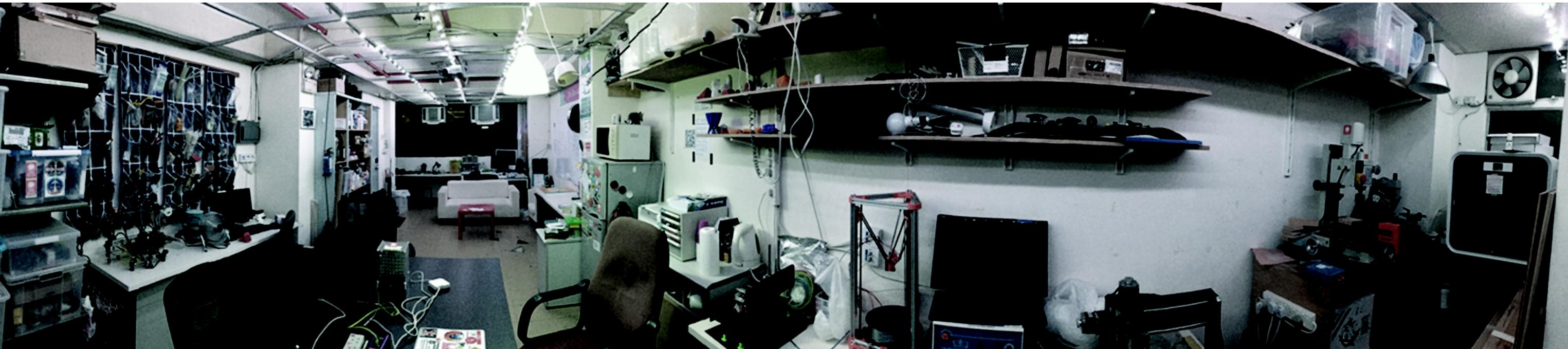
dimsumlabs.com



HackJamHK



[dimsumlabs](#)



The Urban Organism | 35C3

點心實驗室



(trans: *Dim Sum Labs*)

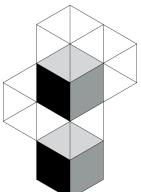
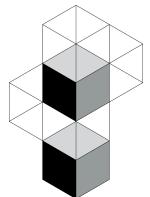


Image: Stefan Lins - "Dim Sum",
(<https://www.flickr.com/photos/mrlins/5559759217/>) CC BY-NC 2.0



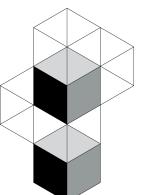
In *The Field Guide to Hacking*, the practises and protocols of *hacking* is defined by notions of peer production, self-organised communities, and the intellectual exercise of exploring anything beyond its intended purpose. Demonstrated by way of Dim Sum Labs hackerspace and its surrounding community, this collection of snapshots is of the work generated from an organic nebula, culled from an overarching theme of exploration, curiosity, and output.

This book reveals a range of techniques of both physical and digital, documented as project case studies. It also features contributions by researchers, artists, and scientists from prominent institutions to offer their perspectives on what it means *to hack*. Altogether, a manual to overcome the limitations of traditional methods of production.

TFGTH

The Field Guide to Hacking

Dim Sum Labs | Michelle Poon



Foreword by Mitch Altman

ISBN 9789887939702



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The Urban Organism | 35C3

M i t c h A l t m a n

F O R E W O R D

This book took a lot of time and energy to write! Lucky for me, I was merely asked to write this foreword. I'm a lazy bastard. That is why I love hackerspaces—I don't have to be the one to do all of the work.

Back in 2007, when I helped create Noisebridge, one of the early hackerspaces in the US, I knew I didn't want to be the leader. That's way too much work. Instead, everyone is empowered to do all the cool things. And, at the beginning, to help start Noisebridge, all I had to do was put out the word, say it was a cool idea, and help organize meetings. And give a bunch of workshops. And be the treasurer for the first two years. And build a bunch of stuff. And lots of other stuff. But so many others were doing everything else that was important to do, and the stuff I did was all the stuff I was good at! And all the stuff I thought was way worthwhile. And fun! This is what happens when people come together in community and support each other to do the cool things we do at hackerspaces. This is called "DO-ocracy"¹. This shit works! Which is why we do it at hackerspaces all over the world. If we need help, or need to learn more to do it better, there is always someone around to ask for help. We can do a lot on our own. And in a community, we can do so much more.

Here we are, over 10 years since the founding of Noisebridge, and there are now thousands more hackerspaces in the world. Of course, sometimes people might call them "makerspaces", but whatever you call them, they are physical places with vibrant communities that encourage people to explore and do things that each person finds way cool, way meaningful, way wonderful. Obviously, making a thing is cool, but hackerspaces are about so much more than just making a *thing*—they are all about their communities. It includes the tools for making things, and the making of the things comes from people coming together.

Since helping start Noisebridge, whenever and wherever I travel all over the world I visit local hackerspaces, or visit people wanting to start a hackerspace. These are some of the more delightful people on our planet. And so many cool things are going on in the communities they form. Each community is unique. Yet, all are supportive. And all hackerspaces continue to help each other. We teach, we learn, we share. And so many interesting projects come from hackerspaces as a result—from the magical combination of community and creative expression.

When I give interviews I'm often asked, "What is your favorite project from a hackerspace?" This question, to me, misses the point. There are, indeed, lots of way cool projects at hackerspaces, but it's not about ones that I think are the coolest. It's about what each creator personally feels is way cool. Those people are highly motivated to learn all they need to learn to make their project as awesome as possible. And awesome projects are the obvious outcome.



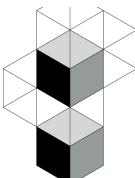
I've been traveling to China every year since 2003 to manufacture TV-B-Gone universal remote controls². In 2009, I thought it would be interesting for hackers from all over the world to join me and see what China has to offer, and *Hacker Trips To China* have been happening ever since. As our group travels around, we are often asked to talk about our projects and our communities to inspire people abroad to do cool things. The more we did that, the more we've been invited to do this more. Other communities started to get involved. And before long, the first hackerspaces in China and the rest of Asia were appearing, of course, including Dim Sum Labs. Now there are thousands around the world! Because of this, there are a growing number of opportunities for more people, everywhere.

One of the wonderful things about this book is that it presents a lot of awesome projects, each created by someone who felt their project was way worth creating. Whether it is practical, helpful, just-for-fun, challenging, or simple—each person felt motivated to create their project, and share it. Most importantly, it all happened in the supportive community of a hackerspace: Dim Sum Labs, a way cool hackerspace in Hong Kong.

— Mitch Altman, riding on a train approaching Berlin, December 2017

¹ Unlike *democracy*, this is not about (s)elected officials. This also is not *meritocracy*, since it's not about being the best. Instead, you do it because it's an idea you feel is worth DOing.

² TV-B-Gone universal remote controls are an invention of mine. They are keychains that turn off TVs in public places. These became popular enough that 12 friends and I have made a living from this project for the past 13 years.



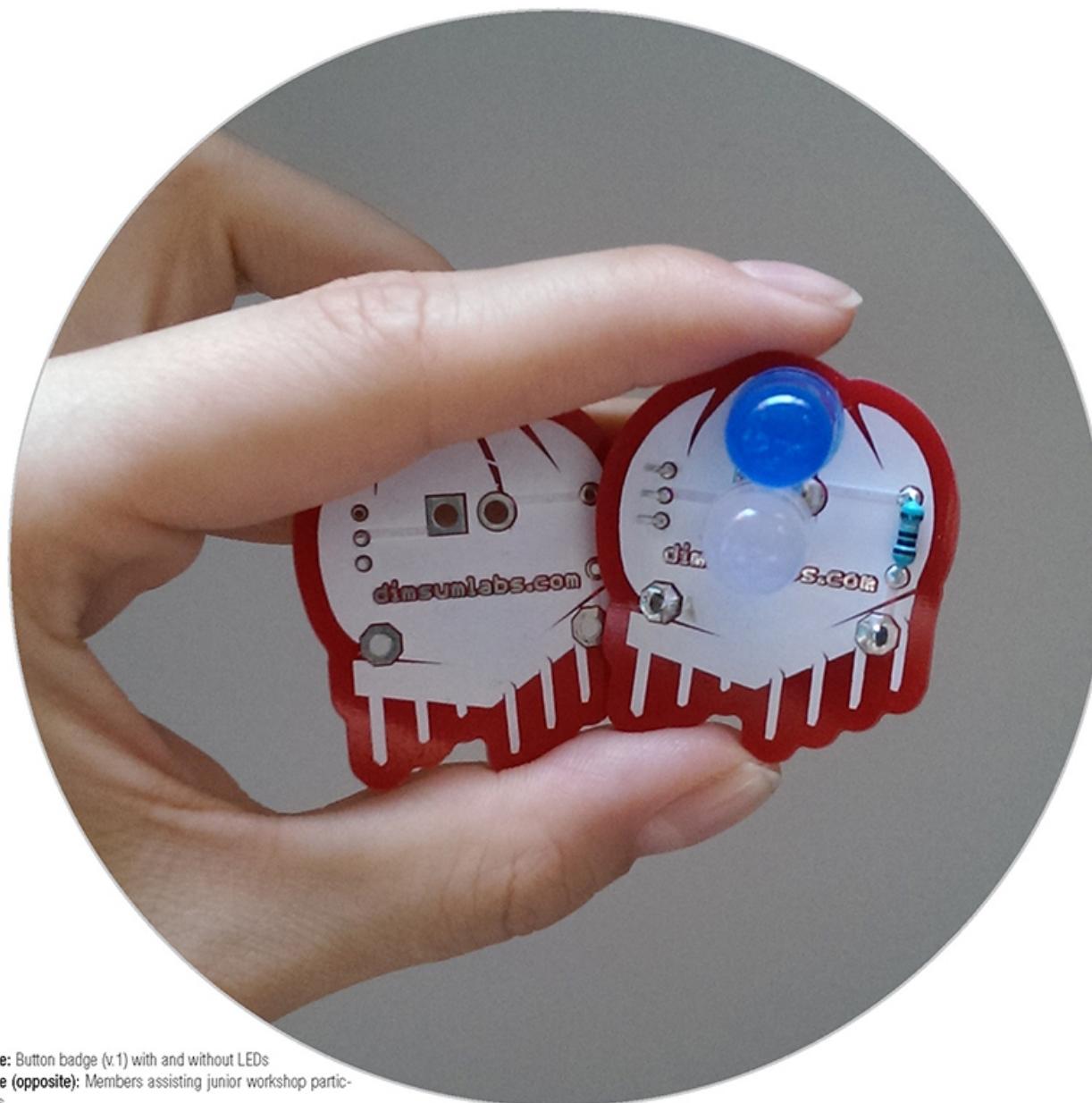
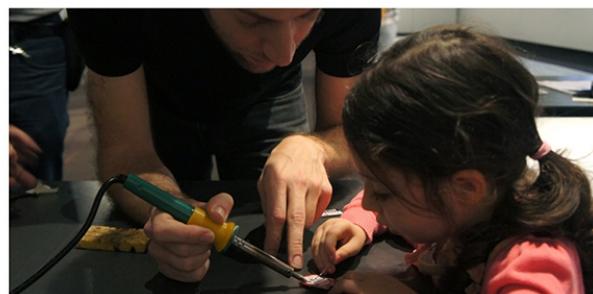


Image: Button badge (v.1) with and without LEDs

Image (opposite): Members assisting junior workshop participants

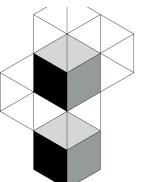
Lionello Lunessu DSL BUTTON BADGE



Like many other hackerspaces, we run workshops from time-to-time not just for the purpose of expanding the community or sharing knowledge, but also as an additional source of revenue.

Like most hackerspaces, we always have heaps of LEDs on hand—sometimes from donors, sometimes from misplaced orders, and at one time because a certain online DIY community sent us a giant boxful. In the past, we would encourage our junior visitors to decorate their drawings or laser-cut cardboard with LED throwies—simply an LED fixed onto a coin battery that can be magnetised and stuck anywhere. Eventually this matured into the quasi-official Dim Sum Labs Button Badge, where any one of the members could order a set and run the workshop themselves.

Or even you could, since the PCB schematics (and much more) is completely open access.



LIST OF PARTS

- A - custom Dim Sum Labs circuit board
- B - 3V coin battery, 20mm
- C - 3-pin slide switch
- D - 10mm LED¹
- E - 90 ohm resistor
- F - coin battery retainer
- G - badge fastener

REQUIRED EQUIPMENT

- soldering iron
- hot glue gun

DIRECTIONS

Soldering is the mainstay of any hackerspace, since it's one of the most fundamental skills in the electronics world. It's possible to build projects without soldering, but at some point you'll want everything to stay put in the way you want it.

Physically, soldering is a simple action—dig deeper, and there are a whole lot of details that allow for refinement. Perhaps a bit like jogging.

This can include the order of component installation (start with IC [integrated circuit] holders, followed by resistors, capacitors, diodes, LEDs, transistors, solid wire, stranded wire, and ending with ICs); some divisive opinions, such as the use of flux; or the profile shape of your soldering tip. Then the whole topic could carry over to learning how to build a circuit, calculating voltage/current/resistance, and so on.

¹ You could also use a more standard 5mm LED, though you would have to either space the legs more carefully to separate the polarity, or get creative. There are a few examples shown later.

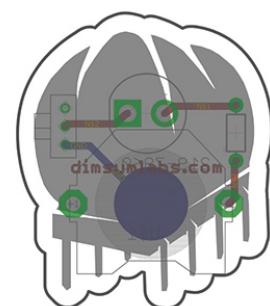
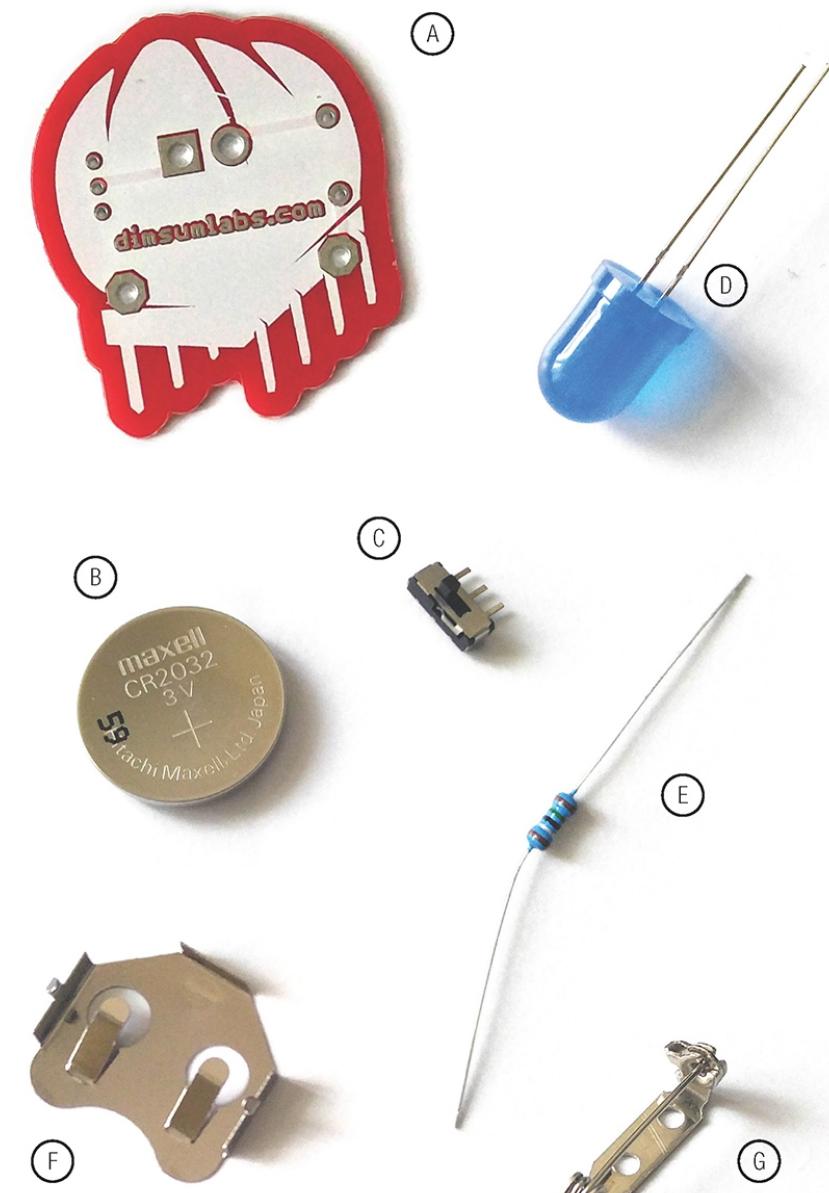
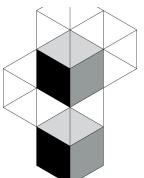
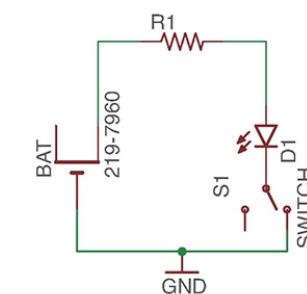


Figure 1. PCB layout (left) and schematic (right) using EAGLE



After receiving the boards, we realised the holes were a bit too big for 5mm LEDs, but we remembered there was giant box of 10mm LEDs stashed somewhere from an abandoned project.

Two wrongs DO make a right!

(Don't forget about the polarity of the LED—the positive leg (anode) is the longer one, that goes into the square hole.)

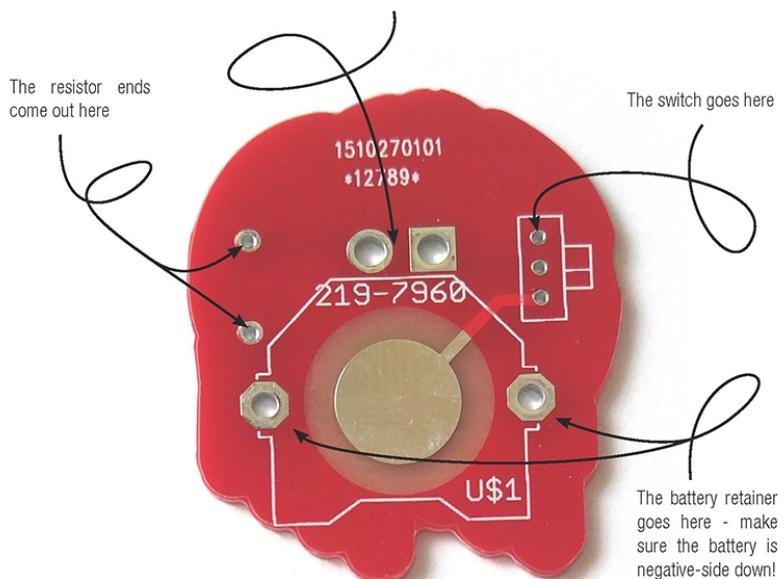


Figure 2. The original PCB design with indications of component location

The PCB (printed circuit board) was designed in EAGLE²—the *PCB layout* and *schematic* is pictured here (Fig. 1), where the different colours represent different layers of the PCB. Red is the *top* (or front) copper layer, blue is the *bottom* (or back) copper layer, while green represented the *through-holes* that connect the two layers. Black is the *dimension* layer, meaning the edge of the board, while grey is the *silk* layer, which includes the white text, values, and placement guides for the components.

There are heaps of resources³ on these topics, so let's assume you did your homework and we can go straight to the badge!

In the general scheme of *hacking*, the badge resources are openly available (github.com/dimsumlabs/dsl-workshop), so it's encouraged to not only follow along but hack it as you wish.

1. Sometimes it helps to have a bit of masking tape (with the sticky bit looped out), so the whole thing doesn't slide around your bench.
2. As mentioned earlier, there's a general rule of thumb for which components get soldered on first—we start with the resistor here, following the illustration (Fig. 2, 3). We like to have the resistor on the front face of the badge. Just 'cause.
3. After that you flip it over, place the switch and battery holder along the outlines, and gingerly flip back (facing the front) to solder the legs.

² A free trial is available for download from Autodesk's website (autodesk.com/products/eagle/free-download).

³ One could begin with the tutorials on NASA or Adafruit.com; the latter of which is a hardware company, but is abundant with learning materials, while these PCBs were ordered from dirtypcbs.com.

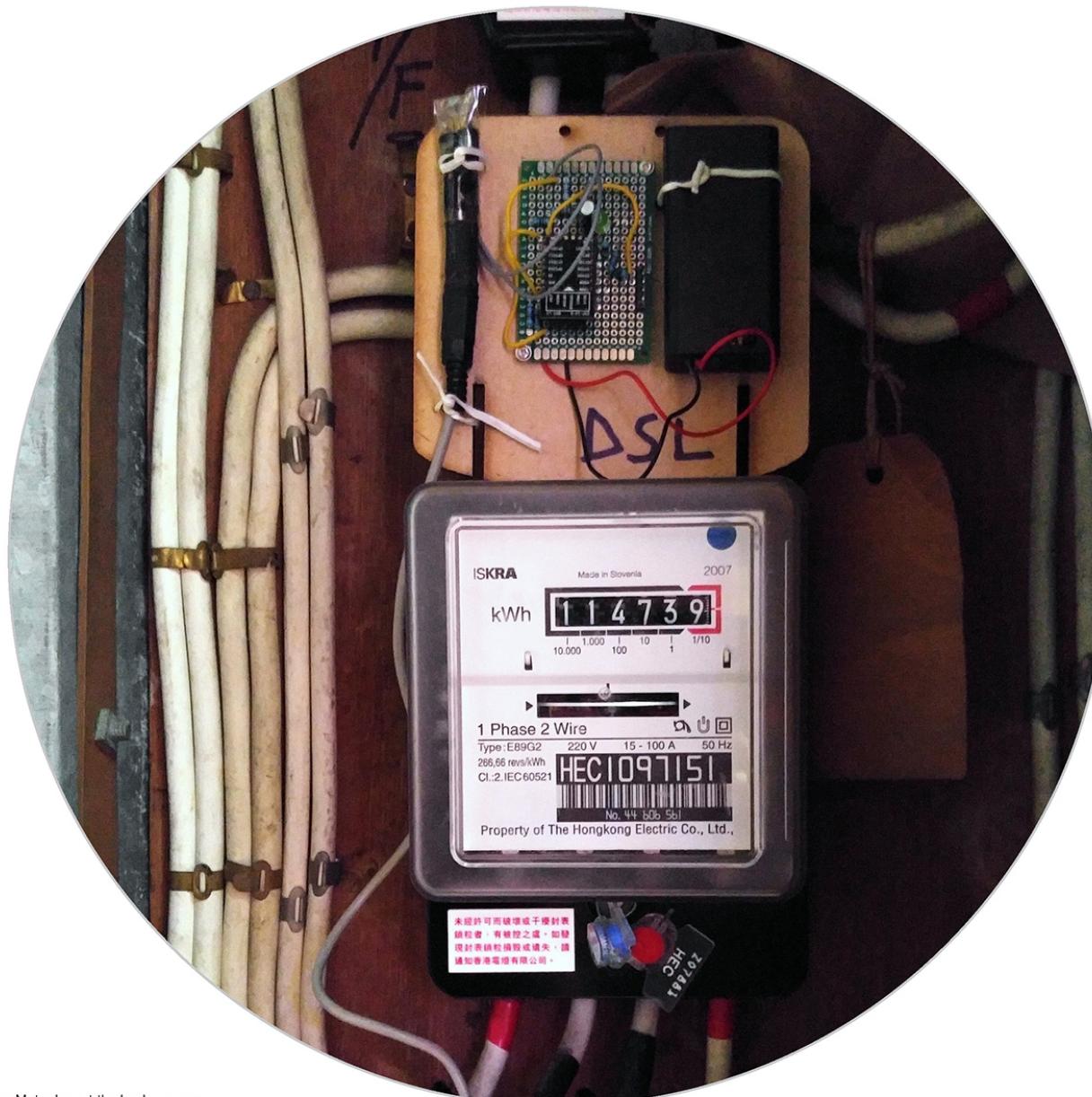
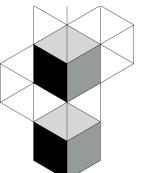


Image: Meter box at the hackerspace

T o m T o b b a c k
**K I L O W A T T
C O U N T E R**

My home energy monitoring system based on the OpenEnergyMonitor has been running for over three years now, with the original RF setup (868MHz) between emonTx and emonBase. However, nowadays the cheap ESP8266 WiFi module seems to be a good choice for a wireless node, where the only limitations being its relatively high power requirement during transmission, and the fact that it only has 1 ADC pin. So for battery-operated nodes, it might not be an ideal solution. Nevertheless, i decided to build one just to find out how viable it is.

It turns out that someone already has modified the emon library for the ESP8266: EmonLiteESP. The hardware side is quite simple as well, based on the excellent OpenEnergyMonitor documentation.



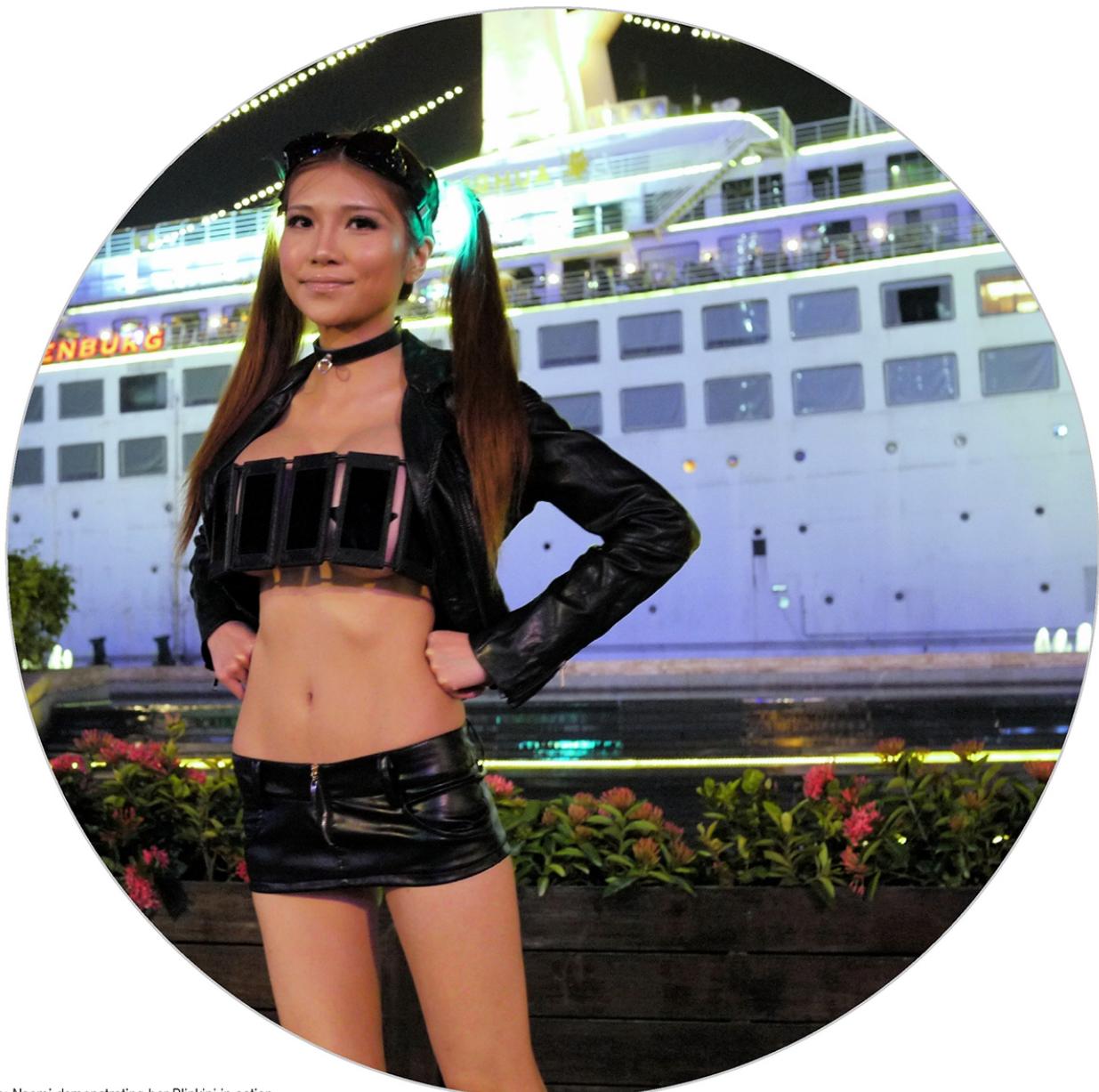


Image: Naomi demonstrating her Blinkini in action

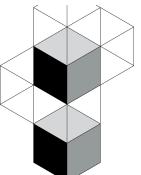
Naomi “Sexy Cyborg” Wu B L I N K I N I

In principle, the work that Naomi produces exemplifies the intent of this book—the action of hacking, making and creating is not an esoteric allusion, but a product that comes from a bit of time, a lot of drive, and an endless supply of curiosity.

Sometimes the content of her work can be quite polemic. In the realm of fashion tech, her projects include some of her personal ambitions towards wearables while reminiscing upon Chinese culture, and at the same time as a discreet form of protest with the status quo. During our collaborative process for this publication, I would receive media enquiries in attempt to verify her technical competence and authenticity. My reply, “what exactly about 3D-printing is so difficult where it would garner doubt?”, and along with that—coding, making, hacking, fabrication—what in particular raises disbelief? The answer to those questions speak more about unfortunate mindsets than it does about her abilities.

This project, in particular, is her metaphorical middle-finger towards her exclusion from Make: Magazine; but also due to the body-conscious nature of the work, it serves to question our own perceptions towards feminism, sexism, and cultural attitudes towards the body and sex. A part of this can be described in her own words:

This project was inspired by my experience with Make Magazine. While I'm a huge fan they have a pretty serious dress code for women appearing in the print edition—they have not shown a female midriff in eight years. This has made it difficult for the current generation of young female Makers who work on Wearables, Cosplay and Fashion Tech to have their work acknowledged. Make has refused to discuss just what the editorial guidelines are, so we have no way of adjusting our content to meet them. If Cosplayers, EDC girls and Tech Fashionistas were all going to be excluded for not meeting another generations unwritten definition of “appropriate”, I set my mind to showing them just how inappropriate a creative Maker girl could be if she set her mind to it—and decided to hit Fashion Night at the upcoming Shenzhen Maker Faire in style :P



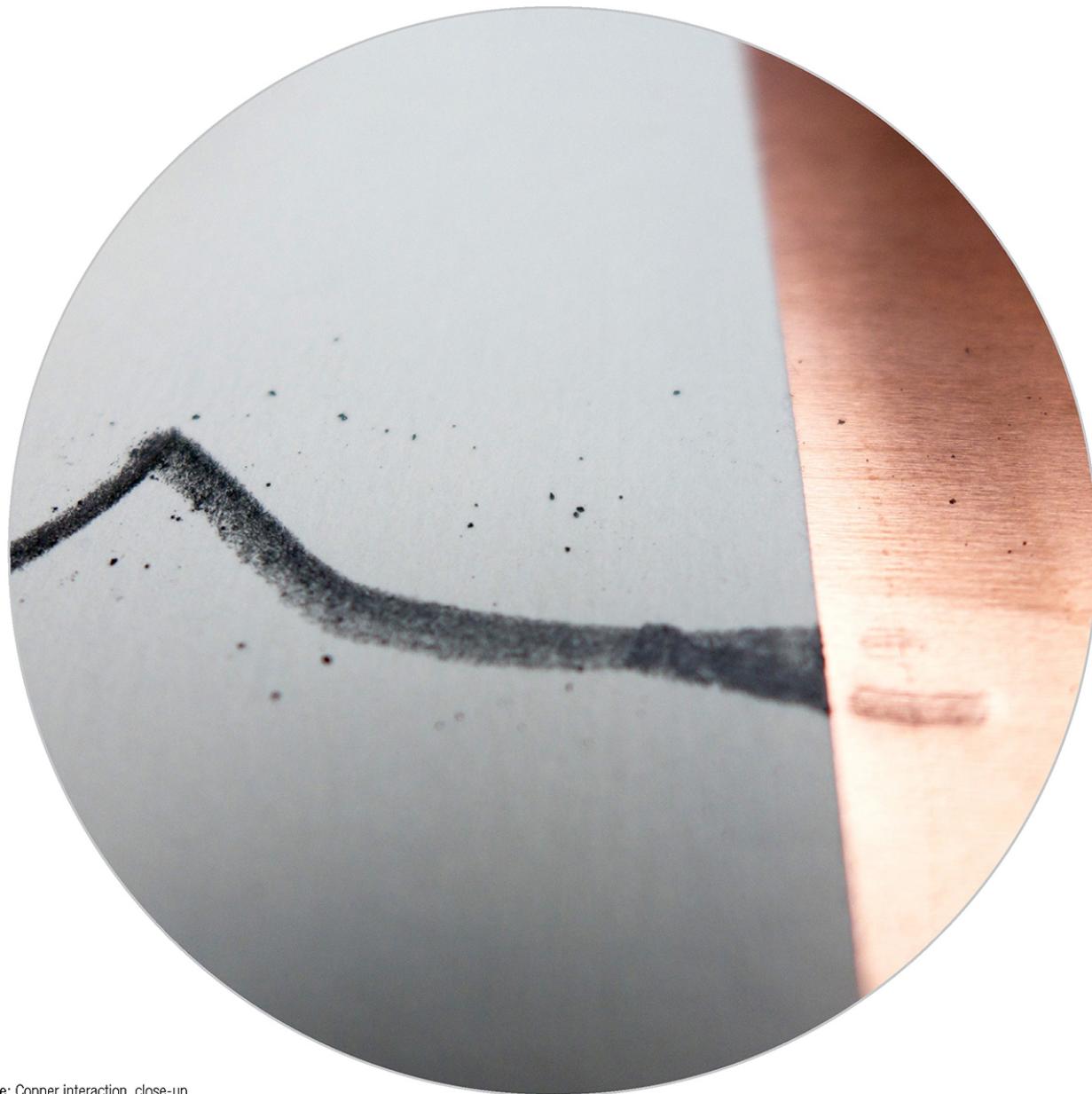
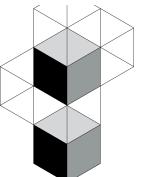


Image: Copper interaction, close-up



M i c h e l l e P o o n
S a v i o W o o
F I E L D

[

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]

LIST OF PARTS

- A - Ceramic Capacitor - 0.01u, 0.1u
- B - Electrolytic Capacitor - 10u, 100u
- C - Resistor - 1K, 4K7, 10K, 47K, 100K, 500K
- D - CdS Photo-resistor - GL5549
- E - 555 Timer - LM555, NE555
- F - LED (white) - LED1206
- G - NPN Transistor - 2N3904
- H - 4-Position DIP Switch - 4-POS SPDT
- I - PCB - 50x50mm
- J - speaker
- K - 9V battery
- L - 4B pencil
- M - copper plate

A V E R Y T E C H N I C A L O V E R V I E W

Circuit description and some other stuff

FIELD is a custom-made project for *The Field Guide to Hacking* (TGFTH Limited Edition), where the outer sleeve of the book comprises copper panels on the face, a PCB embedded on the reverse, and a side kit of peripheral components. Integration with the cover meant the recovery of every micron¹ possible, which leads to a 0.8mm thick surface-mount² PCB.

FIELD comprises two major sections, an APC (Atari Punk Console) and a LFO (Low Frequency Oscillator). The two are connected to various sensing components such as copper plates and/or a CdS photoresistor. There is also an LED and a 4-position DIP switch. Details are as follows.

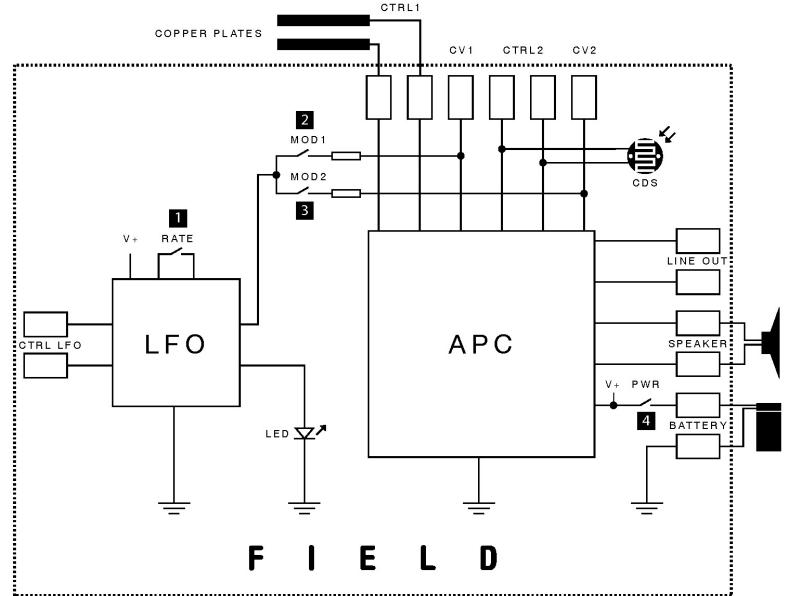


Figure 1. Schematic circuit diagram of the PCB used for TFGTH version

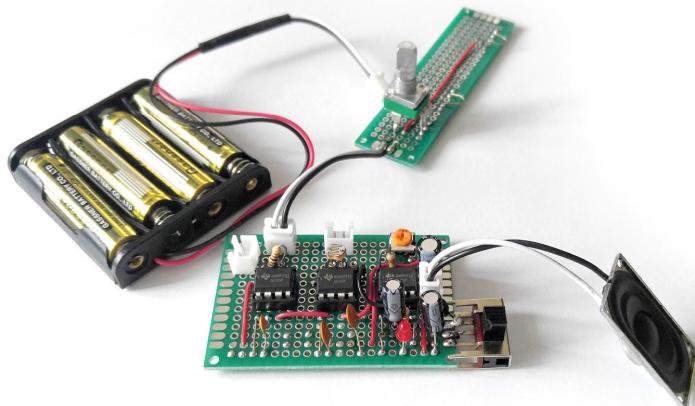


Figure 2. Initial prototype with CdS and pot(entiometer)

1 micron = 1000 micrometres

2 There is a through-hole version designed for Sónar+D Hong Kong, a music/art/technology festival on March 17, 2018.

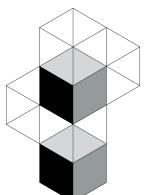




Figure 1. Hong Kong, Central district—the glitzy centre of speed and excess.

M i c h e l l e P o o n

Saccharin City: Hong Kong, Part 1

saccharin /'sækərɪn/

NOUN A sweet-tasting synthetic compound used in food and drink as a substitute for sugar.

Late 19th century: from modern Latin *saccharum* 'sugar' + -in.

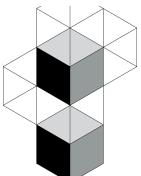
Sugar, in this context, refers to the sweet life. One of convenience, luxury, and glamour. The fabulous aspects of a metropolitan lifestyle, or one of excess and inequality, depending on your class consciousness (or lack thereof).

Sugar, in the edible context, is incredibly addictive, disguised as a simple pleasure, where “more than anything, our imaginary drug makes [people] happy, at least for the period during which they’re consuming it” (Taubes 2016).

Both instances of sweetness refers to instantaneous pleasure with superficial calories.

Hong Kong is a mega-dense metropolis, with contradictory shifts in characteristics—is it the glamorous city life of the Central district or the raw spontaneity on the streets of Sham Shui Po? Modern new skyscrapers or traditional *tong-lau* walk-ups? How British? How Chinese? Technologically-advanced with the Octopus card and MTR system, or stuck in the past with fax machines fronting civil service offices? In whichever way a citizen interacts with these oppositional forces, it is clear that the balance is unequal. It is obvious that the financial conglomerate is king, and we are simply fools.

All across the globe, the economy continuously slows, attributed to declining productivity. While each technological revolution allows us to offset mundane tasks, we've also been offsetting the responsibility of monitoring these machines to large-scale institutions.





Daniel C. Howe

YOU HAVE PRESSURE, I HAVE PRESSURE Hacking, Art & Activism in Hong Kong

Sometimes when two things seem similar enough, we are tempted to say they are the same. Often they may be similar, but rarely are they the same. This is the case with artists and hackers. Hackers are not artists, and artists are not hackers. Except when they are. Nevertheless it's interesting to consider the question, especially in a setting like Hong Kong, where practices of all sorts are pushed up against each other on a daily basis. When I was asked to write about art, hacking and activism in Hong Kong, I thought first of the *Hong Kong Blondes*, who we'd been discussing in my "Hacktivism" class. The Blondes, with glam leader Blondie Wong, were among the first politically-motivated "hackers", working with the *Cult of the Dead Cow* (CDC) group in the US to smuggle dissidents out of China after the 1989 Tiananmen massacre. Though the CDC were never averse to hyperbole, one member said that the Blondes, who operated in and around Hong Kong, had "the capacity to snap the backbone of the Chinese end of the Net." (Hesseldahl 1998). My second thought, in sharp contrast, was of Art Basel, the art fair that, in 2013, chose Hong Kong as its second location, and has been critiqued as, among other things, an "orgy of capitalist excess" (Salmon 2014). Hong Kong isn't a surprising choice for such events when you consider the largely untapped Chinese art market, and the vast amounts of money flowing through the city on a daily basis. It was, after all, rated, for the 23rd year in a row, the city with the "world's freest economy". And so the art fair is perhaps best recognized as a reflection of this, and with it, the city's shameful Gini coefficient, which recently hit a 46-year high. Hong Kong also has the highest rents on the planet, a condition that leaches into every aspect of creative life in the city. Music venues close (or are shut down) as fast as they can open, artists can't afford work spaces, galleries are unable to show non-commercial art, and one can hardly read a book in a café without being asked to make way for the next customer. And while government officials are happy to trumpet their support for the "creative industries", they appear to have little idea what this might practically mean. Consider a recent statement by Chief Executive, Carrie Lam: "My policy address also promises to promote the creative industry in Hong Kong. Fashion design is an important part of the creative industry that means the most to women". She continues: "If I paid more attention to my appearance, people might think that the proficiency of design industry isn't too bad in a city with such a chief executive." Enough said? Well, you might think, the last five years have been rather turbulent for Hong Kong, so perhaps leaders can be forgiven for focusing attention elsewhere (though perhaps not

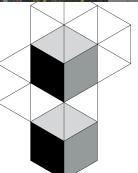




Figure 1. Puzzling together the pieces of Bauhinia history

S c o t t C . E d m u n d s

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GENOMES: The Next Hacking Frontier in the Land of the Bauhinia

As this field guide shows, the concept and practice of hacking software and hardware is becoming increasingly ubiquitous, but I would argue there is an even more important area of hacking we need to be trained for: life itself. Or at least the language of life: DNA. Using four-characters rather than the two of binary digital code, working with the genetic code uses a very similar skill set as computer programming, involving many of the same open source tools that computer hackers are familiar with such as Python, Perl and R. The need to "know thyself" was a useful truth recognised by the Greek philosophers, but a 21st century update of this would be the need "know thy DNA". Or rather know thy genome, the sum of an organism's genetic instructions, which is a question that philosophers, hackers, and all of us as informed individuals need to ask themselves and be aware of in this modern era.

Progressing even faster than previous tech revolutions, advances in genomics technology have been outpacing Moore's law, and the public has understandably found it hard to keep up with these advances and their implications. The human genome project cost \$3 billion US dollars to produce one human genome, and 15 years on the cost of sequencing an individual has plummeted to less than many smartphones. "Big data" is the buzzword of the day, and sequencing data is predicted by some to grow faster than astrophysics, social media and even YouTube (Stephens et al. 2015). As well as an explosion in output, there have also been incredible improvements in miniaturisation, and Oxford Nanopore DNA sequencers small enough to fit in your hand were at the forefront of the fight against Ebola and Zika (Eisenstein 2017). And with a new model under development that plugs into a smartphone, the Star Trek tricorder is no longer science fiction.

Following the trajectory of the IT sector, genomics is going to be a major driver of our economy, but skilled practitioners are in short supply, and there is a lack of trained experts to keep pace with these rapid advances. The potential of genomics to tackle the challenges of food security, disease outbreaks, and an ageing population, needs to be balanced against fears of "frankenfoods", designer babies and genetic discrimination. Education and transparency are essential to allay

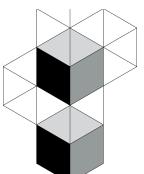




Figure 1. An attendee of a design workshop at a feminist hackerspace deconstructs Silicon Valley.

s a r a h f o x

University of Washington/Berkeley

RECONFIGURING CULTURE/TECH: Feminist Approaches to Design and Engineering

Technology development and feminism may seem at first oppositional: design and engineering often operate as normative change, and feminist theories orient toward undoing normative, patriarchal views. Feminist science scholars and design historians describe how technology production may sediment social hierarchies and how the material world of objects, architectures, and systems delimit the ability of certain groups to act (Weisman 1994; Wajcman 1991). For example, historian Ruth Schwartz Cowan (1985) describes how the introduction of household technologies such as the microwave led to more, rather than less domestic labor inequality (with women disproportionately expected to manage the newly industrialized home). Even in cases where women or femme-identifying people contribute to the work of design, it is not uncommon for their efforts to go unattributed or overlooked within traditional engineering environments (Allhutter 2012; Sefyrin 2010). Historian Mar Hicks (2017) details, for instance, how the role of structural gender discrimination led to the decline of Britain as a technological leader at the mid-century, putting gendered hierarchies even above national economic advantage. In contemporary settings, Dawn Nafus examines open source software developers to suggest a “broader problem of socio-technical construction, where both the material aspects of computing and the social identities that people create for themselves [...] are cultures made by and for men” (Nafus 2012, p.671).

Put into practice, this perspective has prompted Leah Buechley and colleagues to develop hardware and software tool kits to help people, especially girls, develop engineering skills through craft activities such as sewing (Buechley and Hill 2010). Through examining and re-constructing the tools of electronics-making, electronic textile artist Irene Posch (2017) notes how the material of technology development are not neutral, but rather define what resultant forms are (and are not) possible. Civic media scholar Catherine D’Ignazio and colleagues take up the format of the large-scale hackathon in order to focus engineering attention to the task of redesigning the breast pump, a technology the researchers identify as long overlooked by industry (D’Ignazio et al. 2016). Together these projects have helped scaffold a growing literature concerned with feminist framings of technology cultures, offering direct ways for researchers and practitioners alike to critically and productively explore alternatives to current design situations.

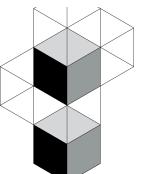




Figure 1. DSL's DIY arcade: Nintendo-emulator with joystick controls.

Luis Felipe R. Murillo

IFRIS, CNAM/LISE

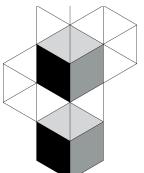
DIM SUM LABS MEMORIES: Joys and Tribulations of an Open Lab

"This place, this non-home home is more than that though. It's a place to chill, a place to party, a place to work: a place to worship the technology that makes up its members hearts and dreams. The members, the initiates, the visitors, these are people who live and breathe computers: who want and need them for all they do, who draw from digital devices the strength to do whatever they damned well want. In that sense, then, this is a place of worship"

tfish, L0pht history (l0pht.com/history.html), 2009

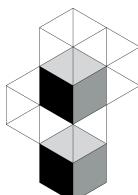
Dim Sum Labs (DSL) is a place of re-invention, discovery, self-cultivation, and wonder. A place of exchange, generative bricolage, and encounter across a spectrum of differences. It is distinctive for the sociotechnical ties it has created between people and projects since its incorporation in 2011. And, yet, it shares many characteristics and open-ended projects with other community spaces that are representative of what our editor, Michelle Poon, has called "DEFRAG."

As an anthropologist but also, perhaps more importantly, a lab mate, I came to DSL after field research in Shenzhen where I spent a great deal of time across the border with the SZDIY folks, whenever I did not find myself busy visiting companies and collecting interviews with people who work with Free and Open Source technologies in mainland China. My project at the time was dedicated to the study of collaboration and coordination dynamics in software and hardware production. Before coming to Southern China, I spent a great deal of time and energy in Tokyo documenting the production of Open Hardware-based devices for radiation monitoring after the Fukushima disaster. Before Japan, I participated in the troubled experiences of radical openness at Noisebridge in San Francisco; and had my initiation a decade and a half earlier in the context of the Brazilian Free Software movement. Looking back I can see a conductive thread linking all of these experiences of direct participation and research. What puzzled me back then, and still does, has to do with the paradox of participation: despite a strong emphasis on the discourse of openness, collaboration is everything but trivial to achieve. There are barriers of entry and varying levels of access to community projects, despite the fact that we are immersed in narratives of Internet-based participation and implicated in the very construction of "technologies of participation." As counter-intuitive as it may sound, collaboration turns out to be much more of an endpoint, a collective accomplishment, than a point of departure.

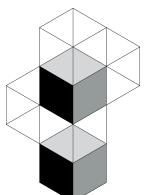


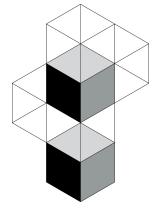
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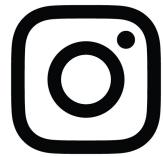


Pt.3:
But whaaaaat?





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