

**female led
tech at
the border
between
art and
science**



**agnes cameron
wcmt 2016**

“young white men, aged 20-30 are the people who control how technology will be developed, and how technology will be available to the general public. This is the very definition of a control economy.”

David Li

A NOTE ABOUT THE PROJECT

how this project was carried out

I spent the bulk of my time in China living in Shanghai, in a flat rented in the Jing'an district, making trips to both Beijing and Shenzhen. Shanghai was chosen because of my contacts in the art and tech scenes there; Beijing for its links to the government, as the centre of China's consuming middle classes, and Shenzhen - the 'Hardware Silicon Valley' as the origin of China's technology boom.

I spent my time traveling with my partner Gary. As a fluent Mandarin speaker, and a new media artist and writer, it would be hard to imagine speaking to some of the contacts in this project without his help (let alone eating food, navigating buses, and understanding much of what was going on around us).

the report

The style of this report aims not to be overly-formal, and instead fun to read and interact with. It is intended to reflect the creative and somewhat holistic route this project took, and as such is split into the main narratives and geographies explored by the work.

In as much as is possible, the chunks of writing are modular and can be read or skipped depending on the interests of the reader. I do not think it is worth talking about 'Chinese new media technology' without, for example, exploring the issues around the Chinese Internet, neither do I think it is worth talking about 'Chinese women' without discussing what it could mean to be a woman in modern China.

lastly

I would like to thank WCMT immensely for funding this work. I learned so much more than I had ever expected to, and have had a chance to experiment with new ways of thinking about the problems I want to address. Since my return, I have been able to use my experiences to start some really interesting projects, reaching a whole lot more people than I otherwise would have done. My determination to dedicate my engineering work to the public communication of science has been amplified. It has also been a lot of fun.

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BACKGROUND + MOTIVATION

I spent the summer of 2015 working for a Computer Security research group in the Computer Laboratory, in the University of Cambridge. After I left, the group contained more men called David than it did women. At around the same time, I'd got in contact with a company called Metaverse Makeovers. Based between Shanghai and Melbourne, they were a female-led start-up riding on a wave of Chinese investment, selling augmented reality (AR) nail art to a tech-savvy female market.

Talking to the Metaverse CEO Thea Baumann, I got an impression of the tech scene there: brutal, fast-moving, but anyone's game. New media technologies - a blanket term used to describe everything from VR goggles to internet-enabled water bottles - were springing up everywhere, and not just made by tech giants or California bros. The Chinese tech market represented a break from the dominant Western narratives: of Apple, Oculus Rift and Microsoft, tech giants playing it safe and laying out the rules for everyone else.

boring Western tech giants

In the week of my return from China, Apple brought out the iPhone 7. Described by the Guardian as an 'aging design', along with an underwhelming 3.5 stars, and criticised for contributing to electronic waste with the removal of the headphone jack, many reviewers were quick to point out that it doesn't really develop any new features. At the same time, in a rush to compete with Apple, Samsung brought out the Galaxy Note 7 - which, although professing a number of new

features also caught fire and required a multi-billion dollar recall.



In short, a bad few weeks for some phone companies. But also the illustration of a problem - huge tech giants are competing to make bigger, better and more exciting versions of what is

essentially a copy of the iPhone. The kind of company that 7 years ago was exciting and fresh is now clunky and patriarchal, with each new design coming out only after years of meticulous marketing research, streamlining and testing.

the UK still has only 9% female engineers

According to the Chinese Academy of Science, over a third of the engineering workforce in China is female. By contrast, the UK, at 9%, has the lowest number of female engineering professionals in Europe (IoP). As a female engineer with a specialism in the field of 'Information Engineering' - a discipline that concerns networks, interaction, computation and communication, my education takes place solely in male-dominated environments. During my degree, less than 3% of my lecturers have been female, and it is rare to see more than a handful of women in a room of 100 or more.

This lack of diversity in new technology is depressingly visible: whether it's the Apple Health app that only included periods as an afterthought, or AIs that show a racial profiling bias, the overwhelmingly white, male, Western tech scene is reinforcing societal prejudices.

it's not like China is just a great place to be female

Unlike Latvia, a country with 30% female engineers and a higher rank in the global gender equality index than the UK (Human Development Report 2014), China does not rank well for gender equality.

I was turned down for an interview with a 3D-printing expert from Shenzhen after I told her my research was about gender: to her rejection, she attached a link to a Guardian article about the arrest last January of 5 prominent Chinese feminists. Female engineering students I spoke to were reluctant to make political comments, and it was often women who had been educated in Western institutions who were able to be most vocal about inequalities in the industry.

China's tech industry is not much of a feminist utopia - from almost exclusively female-staffed tech factories such as Foxconn (famed for poor working conditions that led to a spate of employee suicides in 2010), wage discrimination and glass ceilings, I was intrigued to see how women engineers in China felt about their role in technology.



the metaverse app

DEVELOPING THE PROJECT

aims of the project

The aims of my project were twofold:

Develop knowledge of Chinese new media technologies and use this as a basis both for my own work, and to run workshops to inspire young female engineers on my return to the UK

Look at why China, a society not considered to be gender equal, nonetheless has a far higher proportion of female technologists than the UK

timeline/geography

Shanghai

the bulk of the research for this project was done in Shanghai, in which I spent around 60% of the two months in China. An exciting and vibrant city, Shanghai is a base for many smaller and more international tech firms, and is one of the more diverse Chinese cities. Shanghai is also an interesting art world nucleus, and the base of the Chronus Arts Centre - a new media art research centre that works closely with technologists.

Beijing

I spent a week here, getting a feel for how tech business operates, as well as moving much closer to the heart of the Chinese government. That closeness was very tangible: from the huge, Mao-era roads (almost every road in the heart of the city is a dual carriageway) to the military posters on the subway, the Party felt very present.

Shenzhen

I was in Shenzhen for five days to visit the tech markets, In hindsight, would have liked to have spent longer here. Everyone we spoke to was so welcoming and enthusiastic: by the end of the week we had so many more contacts than we had time to meet with and talk to! The maker scene in Shenzhen is really vibrant right now, and the kind of technology coming out of it is really remarkable.



female workers making motherboards in a tech factory in shenzhen (guardian)



MOPS 天猫

防雾霾

HEPA高效滤芯

智能户外

便携带

无畏放肆呼吸

析风随身空气匣

高效随身空气净化器



天猫 MOPS 天猫出品

advert for a running mask on the beijing subway (david ramli)

developing my questions

I quickly realised that the initial questions I wanted to answer: ‘Why are there more women in tech in China?’ and ‘How does China approach new media tech differently to the UK?’ needed considerable simplification. I settled on more basic questions:

who is making new technology in China?

**what form does new media technology made/
consumed in China take?**

**what are the advantages and disadvantages faced
by women in China compared to the UK?**

who is consuming and selling technology?

**where are the links between art and technology in
China?**

Even then, it was not easy to pin down concrete answers, and every question I asked seemed to throw up so many more interesting queries. The more people I spoke to, the further I was dragged from a single narrative, either by conflicting opinions, or the sheer number of things people wanted to talk about. However, a number of patterns and links took shape, going far beyond my original conception of the project - from credit ratings on dating websites to a Virtual Reality hypnotist, the gender politics of Chinese technology is constantly shifting in new and interesting ways.

exploring sources

A lot of the most interesting takes on new technology in China are coming out of art, and there are a lot of young, female, Chinese artists working with new technologies. Ying Miao’s Chinternet Plus project, commissioned by the Chinese Internet expert and founder of Netizen Michelle Proksell is a critical examination of the Internet Plus conference held in Wuzhen in 2014, and again at the end of 2016. I was also interested to speak to the artist Ye Funa, whose piece Peep was broadcast over (and was subsequently taken down from) one of China’s largest live-streaming platforms.

Because of my interest in technologies intended for and designed by women, I was particularly interested to talk to artists and technologists exploring femme aesthetics.

problems with metaverse

A few weeks before I was due to travel, the CEO Thea stopped replying to my emails - becoming worried, I emailed another contact from the company, the Product Manager, Kati. It turned out things weren't as rosy as I'd been led to believe. Kati had left around a month ago, and the company was collapsing - money had run out, Thea was stuck the states with visa issues, and many of the staff had dispersed either around China or to Australia. By that time, this news was not disastrous: I'd made a bunch more contacts in Shanghai, and was excited to learn more about the tech scene there, but this demonstrated the brutality of swiftly-changing markets.

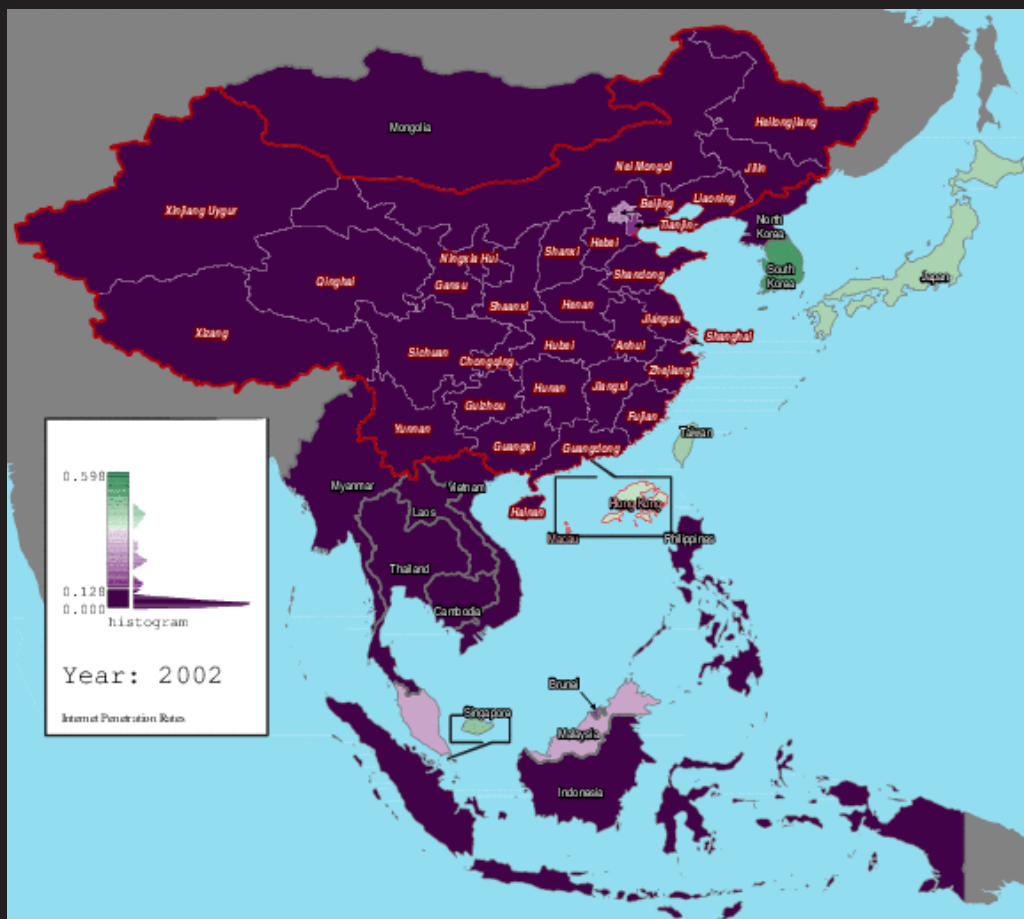


I spoke to Kati at length about the difficulty of running startups in China - a place that can be pretty stressful and isolating for anyone, particularly foreigners looking to join the market. She left me all of her contacts in Shanghai - the kind of people I was hoping to be introduced to through the company - which proved to be a great resource for the project. Though you can get some way in China just by sending emails, the society is pretty closed: the concept of *guanxi* (getting ahead through connections) is alive and well, and with a full list of WeChat contacts - businesswomen, makers, gallerists and artists - I had a real link to the art/tech scene in Shanghai.

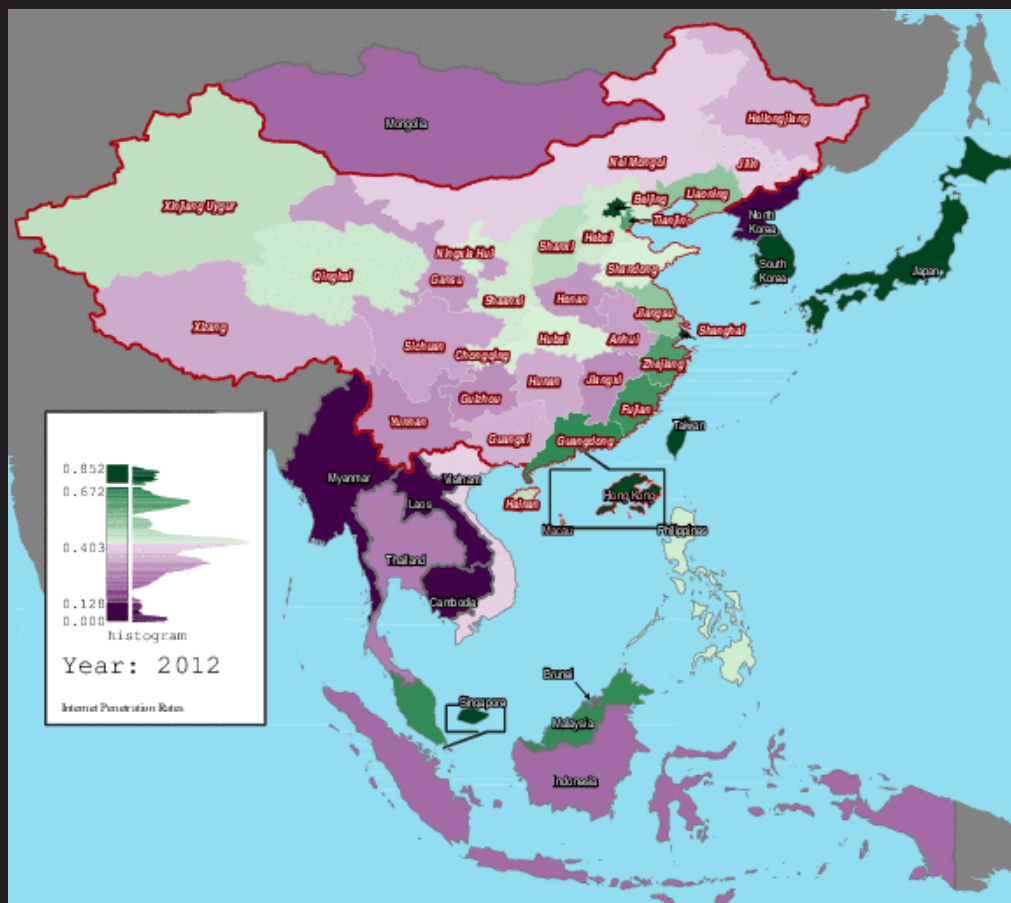
The main impression that I got from Metaverse was that, whilst the Chinese markets could be changeable and treacherous, the climate was one where, with the right idea, tech was anyone's game. Moreover, there is a tech market for young Chinese women, and they shouldn't be underestimated: exciting femme technologies are slowly coming in to the mainstream.



**femme aesthetics in wang newone's work for
SWIM**



young internet: chinese internet penetration in 2002 vs 2012 (wiki)



THE CHINTERNET

One of the things that makes Chinese new media so remarkable is China's unique internet culture and aesthetic. Fast-moving and insular, the Chinese internet (known as the 'Chinternet', a term popularised by net art researcher Michelle Proksell).

China's internet has grown - along with its economy - at an astronomic rate in the past 20 years. This 'young internet' is also heavily mediated and censored by the state in the form of a nationwide firewall, and has shaped a unique attitude to media technologies, in turn changing the way technology is made and sold.

The current form of the Great Firewall is the Golden Shield Project introduced in 2003, though the history of China's selective attitude to media goes back to the very beginning of the opening up process. Deng Xiaoping (China's then premier) is famous for the early 1980's aphorism: "If you open the window for fresh air, you have to expect some flies to blow in". The current system includes wholesale bans on mainstream media: including Google, Facebook, Twitter, WhatsApp Youtube and Snapchat. In the absence of these sites, Chinese equivalents have sprung up to replace them, forming an idiosyncratic Chinese-style internet that defies the ubiquity of the world wide web.

wechat (微信)

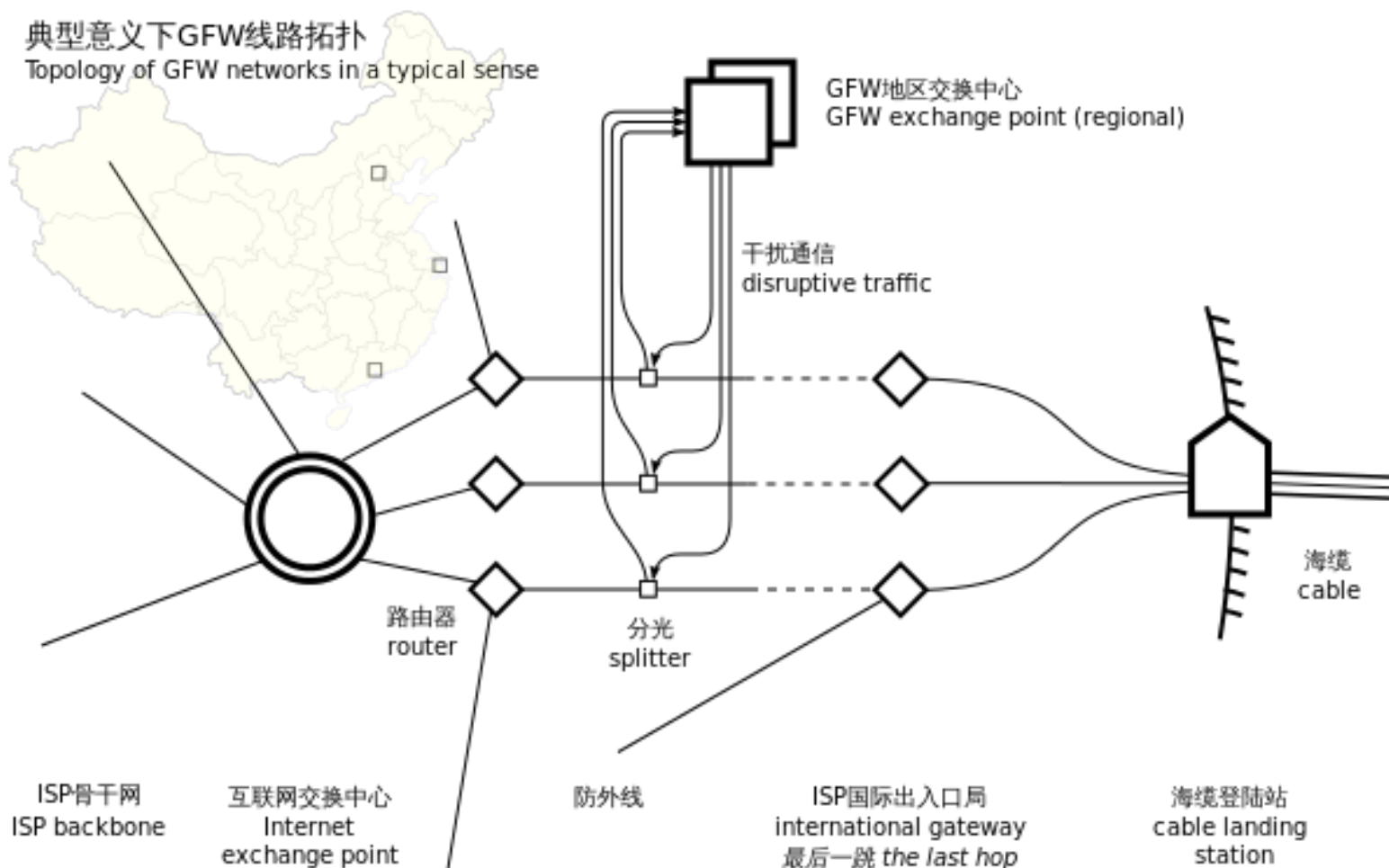
The monolith of Chinternet culture, WeChat is a ubiquitous mobile communication and commerce app used by almost 850 million people, almost all of them Chinese. Unlike messenger apps such as Facebook and Whatsapp, WeChat combines multiple aspects of daily life into one platform, integrating newsfeeds, online shops and real-life payment services. WeChat pay, introduced in 2014 and now ubiquitous in urban China links your bank account to your phone, allowing users to pay for goods by scanning QR codes. Originally seen as a poor copy of Western messenger platforms, WeChat has leapfrogged these apps, and is in turn being copied by Apple and Facebook.

WeChat's structure is comprised of tight-knit groups. The idea of *guanxi* is definitely present: you can only join a group if added by a friend, and all group members are notified of the addition of someone they don't know. There are no search or trend functions as seen on Facebook or Twitter - it is virtually impossible to connect with shared interest groups, and groups themselves cannot grow to more than 300 members.

national internet

The structure of Chinese firewall creates a strange, semi-permeable membrane between China and the wider world. Any packet (of data) coming in or out of China is passed through a server in Beijing, and undergoes Deep Packet Inspection (DPI), a process which checks the data for any unfavorable content. Both these processes add time to the protocols required to load a webpage - not too much time, of course, but compared to the superfast mainland internet, there's a definite difference. This is a sort of 'soft' firewall - while not technically restricted, the extra time and effort required to access western sites makes them seem slow and clunky compared to their Chinese equivalent. So why use them?

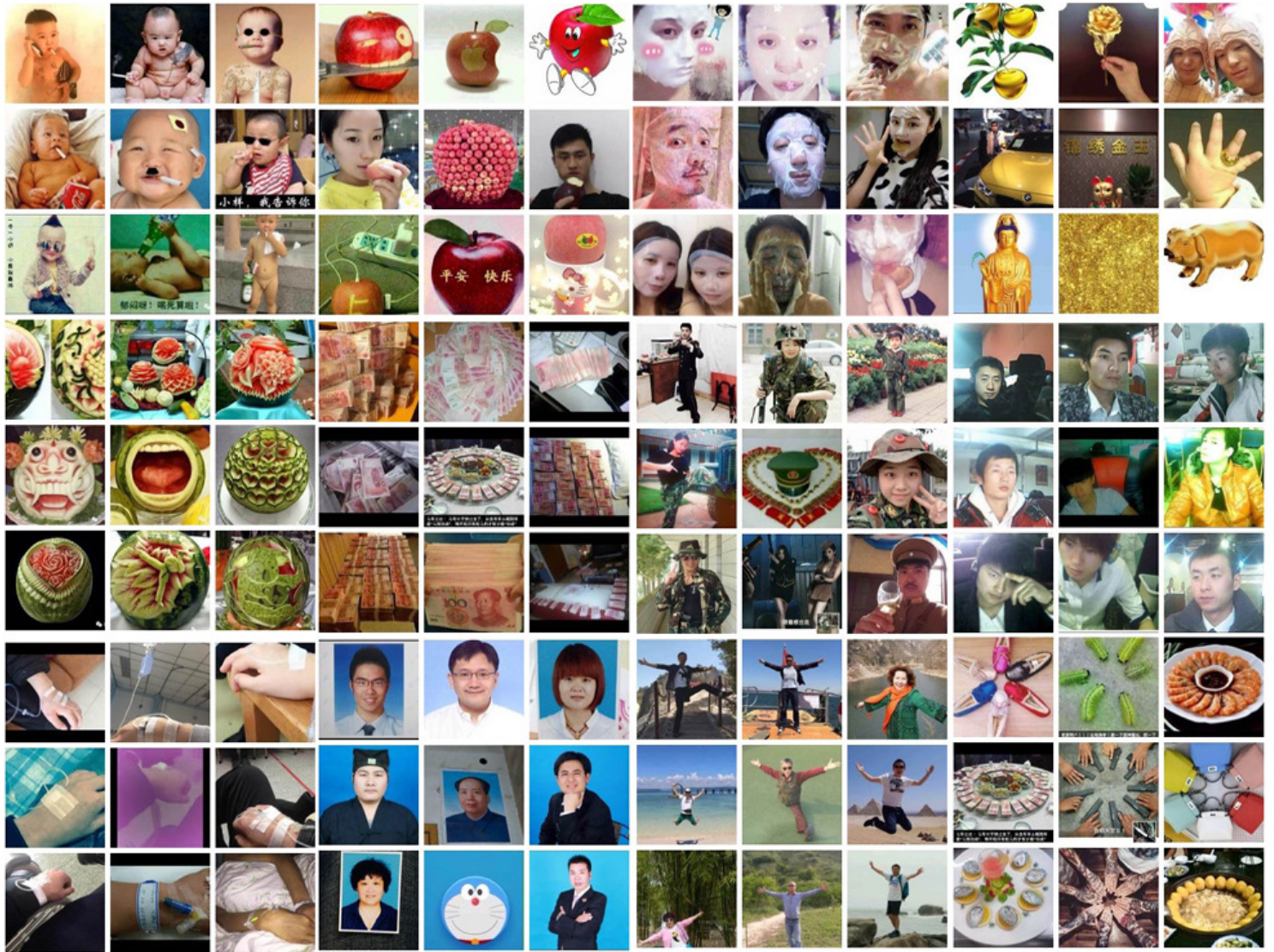
This kind of soft containment is also seen in WeChat. Users cannot link to websites outside of WeChat, and so all interactions remain within the bounds of the app. This system feeds itself: companies and art institutions use WeChat instead of a website, and the domain in which Chinese netizens operate becomes ever smaller. This world-shrinking, unlike the Firewall, is totally voluntary, and thus far more powerful.



topology of the great firewall (wiki)



a wechat QR code



a collection of 'chinternet trends' collected through wechat by michelle proksell for the chinternet archive

michelle proksell

Curator and art researcher Michelle Proksell is the founder of netize.net, a new media art platform known in Chinese as 网友网, or internet friends network. Because of the national quality of the internet, a combination of ultra-connectivity and Chinese in-jokes means that Chinternet memes spread like wildfire, coming and going in the course of a few hours. The Chinternet archive serves as a kind of catalogue for micro-trends: from particular poses to portraits from blue backgrounds, Proksell sources these images through WeChat, charting the changing popularity of particular kinds of imagery.

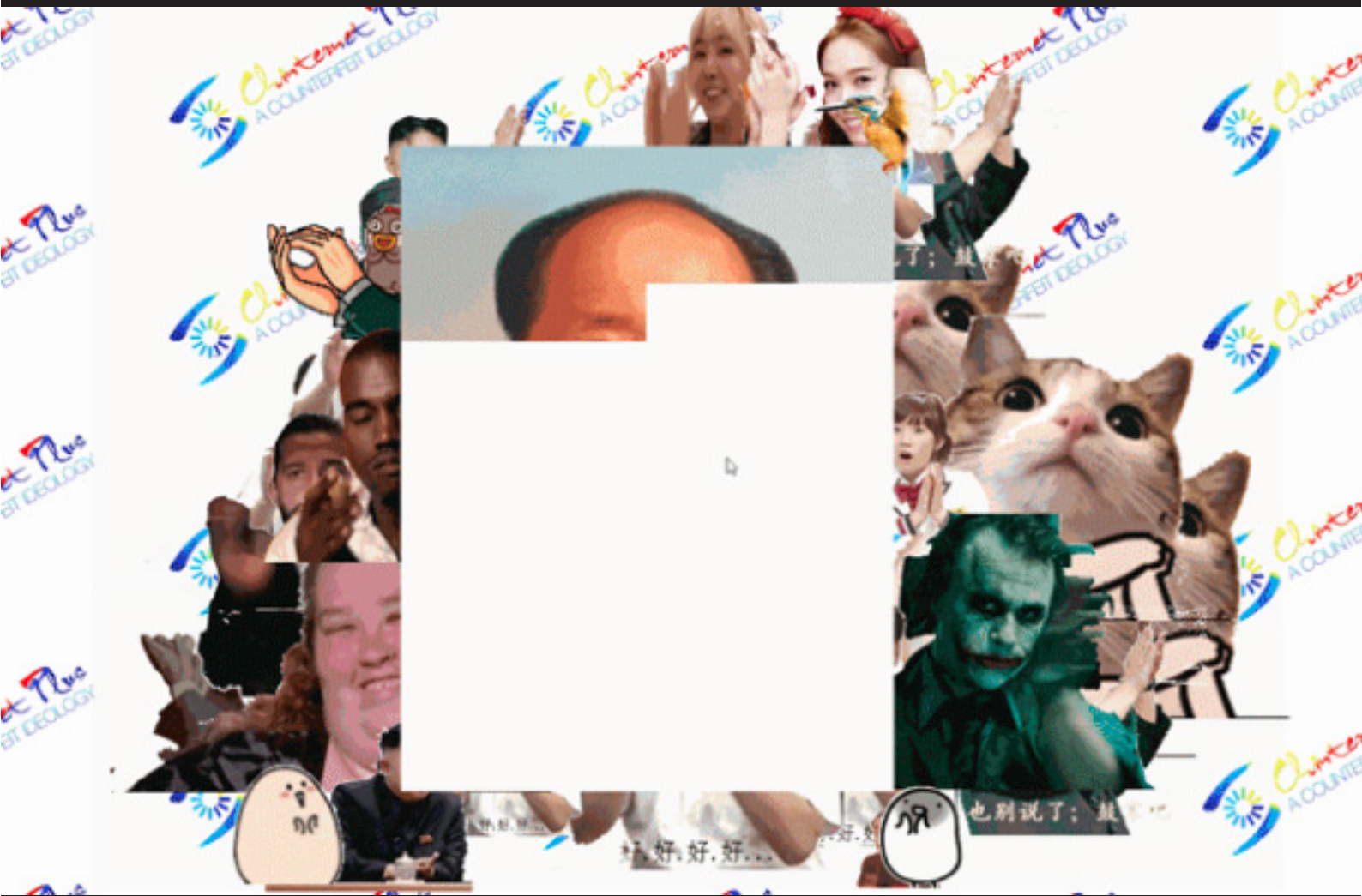
Proksell also worked on a project with Chinternet artist Ying Miao called *The Blind Spot* (2007), where Miao entered every word in the Contemporary Chinese Dictionary into (then-unblocked, but heavily censored) google.cn. A 3-month, word-by-word documentation of encroaching censorship, cataloging how the state dictates the use of language.

the little pinks

Another Chinternet phenomenon is ultra-nationalist internet commenters, typically 12-18 year old girls, who generate internet storms around celebrities seen to be denigrating the Chinese national image. Recent victims of their wrath have included the independence-leaning Taiwanese president Tsai Ing-Wen, whose election prompted a deluge of vitriol to land on her Facebook page, and the Australian swimmer Mack Horton, who accused his rival Sun Yang of doping. There's also a distinct element of humour in the posting, like flooding Taiwanese pages with images of mainland food, debunking the stereotype of mainlanders being too poor to eat well. This kind of meme-based, tech centered nationalism in young girls is an interesting trend in Chinternet politics.

wang hong (网红)

Wang hong literally translates as “net red”, and refers to Chinternet fame, people famous only through internet platforms. Our friend Bruce Bo Ding - head of the public programme at Chronus Arts Centre - told us about watching viral videos on the app *KuaiShuo* (a *Vine* equivalent), identifying visual/conceptual trends, including ‘aggressive eating’ and ‘cute girls in uniform’. In an effort to experiment with these platforms, over the course of our time in China, myself and my partner tried multiple times to achieve Chinternet fame, filming each other eating, sleeping and, on one occasion, throwing durian fruit to each other. Despite never reaching more than a few thousand views, it was interesting to see what people did and didn't watch.



still from ying miao's work *the great firewall of gifs* (2015)

SHANGHAI + THE AESTHETICS OF NEW MEDIA

One aspect I really wanted to get out of this project was to learn more about how tech and art in China were developing alongside one another. Shanghai has a fascinating art/tech crossover scene, with spaces like new media research gallery Chronus Arts Centre (CAC), underground performance space Basement 6, as well as playing host to companies like Metaverse, and the Interactive Media Arts division of NYU Shanghai.

hacked matter group

The Hacked Matter group are a network of maker technologists and researchers tracing the development of new technologies in China. I spoke to one of the founders, Anna Greenspan a lecturer at NYU Shanghai, about her research on tech communities in Shanghai and Shenzhen. She spoke particularly about the misconception in the West that design and manufacture are geographically split. The “Designed in California, Made in China” idea that assumes that sees the West as the active hand of design, guiding a passive developing world. This kind of prejudice has a huge effect on the discourse around tech: where Westerners get to be innovators, it becomes assumed that China can only copy. However, Anna reckons that this is starting to change: with giants like Intel and Microsoft suddenly becoming interested in Shenzhen.

nyu shanghai

After meeting with Anna, I visited NYU Shanghai, to talk to course leaders and students on the Interactive Media Arts (IMA) course. I was deeply impressed by the engagement and enthusiasm of what was a first-year, second-week-of-term class with the task they were assigned: an hour to use a simple circuit design as part of a small art piece. Talking to the founding director of the course, Marianne Pettit, she said that of their most recent cohort (the first class to graduate; the course was founded in 2013) she had been most impressed by the female Chinese students who had thrived, outperforming every other group on the course.

display, distribute

A really interesting take on distributed, decentralised tech solutions came from an art collective called Display, Distribute. An art project run by two women: Elaine Ho and Ming Lin, and a part of the Shanghai Project (an experiment which seeks to explore what the world will look like in 2116), Display, Distribute is a ‘light logistics’ project that uses human travel as the basis for a book transportation network. Currently working on a more advanced web platform, they map the journeys that people would take anyway onto routes to bookshops that need art books. The two are linked and the person and bookshop connected, utilising what translates directly from Mandarin as the macabre ‘human flesh delivery system’.

chronus arts centre

One of the most exciting new media spaces I visited in Shanghai was the Chronus Arts Centre (CAC), with whom I built a relationship over my time there, attending workshops and lectures, and interviewing the artists and technologists doing research work there. The space funds several research residencies every year, and attracts a diverse range of artists and technologists.

haptics workshop

I first visited CAC to attend a 2-day workshop on haptic technologies, as part of a new installation for the space, developed by art/tech researcher Chris Salter between CAC and the IDML (Input Devices and Music Laboratory) at McGill University, Montreal. The installation constitutes a revolutionary exploration of distributed touch and tactile communication: an interesting concept for a city with one of the highest mobile internet usage rates in the world.

Haptics is a form of vibrational touching used to sell everything from smartphones to dildos. Along with augmented reality, it is seen by many as the next big step in fully-integrated digitality. The workshop familiarised the participants with developments in haptic research, playing with ideas of distributed touch through experimenting with the vibrational pads. It was an exciting insight on cutting-edge technologies, and a good introduction to Shanghai’s new tech scene.

hacking workshop

As part of the workshop series on distributed communication, I also took part in a workshop 3 weeks later with hacker/artist Fito Segrara, who leads the research programme at CAC. The workshop explored the effect of different network architectures on the processing of

display distribute's portable bookshelf



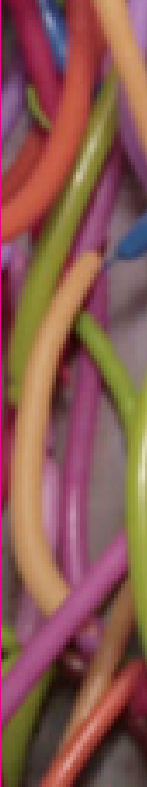
visitors to the haptic field installation at CAC

KATY ROSEL

Through my links with Metaverse, I was introduced to the net artist Katy Roseland, a new media artist who has been resident in Shanghai for the past 10 years, running an underground art venue called Basement 6.

Her work examines interactions within the Chinese internet, explored through a strongly femme aesthetic. Many of her more performative works include some kind of durational 'Chinternet experience'. In particular, Katy's work epitomises the 'whole-life' penetration of platforms like WeChat - the degree to which it colours every aspect of someone's life.

While in Shanghai, I visited her studio to interview her about her work, and her take on gender and the aesthetics of Chinese new media.



Agnes: How do you incorporate Chinese tech into your work?

Katy: Pretty much all my work for a while has been based in WeChat, or livestreaming platforms like *Huajiao*...

Agnes: What's *Huajiao* like?

Katy: Oh, it's hilarious. Like, I've had so much fun seeing who will watch me do the dumbest stuff. I had like, 150 people watching me sleep before. It's also interesting to see how you lose viewers. It's surprisingly hard, even gross stuff, like picking your nose. What's interesting about the livestreaming platforms is that, unlike WeChat, there's not so much of a class divide, and there's a lot more rural people on platforms like *Huajiao*. It's also really anonymous - a bit like the *Dan Mu*. The people watching just pop up and disappear again.

Agnes: A lot of your works play with gender in interesting ways - how does that affect your interactions on WeChat?

Katy: I spend a lot of time making fake avatars and changing my gender to see how people react differently to me. Like, to the point where I get different reactions to photos at different times of day. I'm particularly interested to how people react to cutesy girls - you know, the big-eyed female AI look.

LAND



Agnes: Has anything particularly weird happened to you?

Katy: Oh, plenty. There was this one time, I was doing this durational piece where I lived in [curator] Michelle Proksell's basement in Beijing and used the location function on Wechat to talk to strangers. I made my avatar look like a femmefbot - super *MeiTuShuShu* (a popular Chinese photo editing app).

Anyway, so I got talking to some people, and get added to this group called "Ask For It", which is like 40 silent girls, and 4 guys who appear to be friends. The guys are all chatting - and pretty quickly it becomes apparent that my cutesy avatar has been added to a prostitution ring, where women get paid for sexual encounters that get filmed and put on the group.

Agnes: Are you still in the group?

Katy: Yeah probably - it's gone pretty quiet now though; like, this guy seemed to be having this huge breakdown, posting the weirdest stuff. Like, very dark. I think what's strange about WeChat is having all your life in one place - your boss, your friends, your prostitution ring, your snuff porn.... it gets surreal. And it's all linked to your identity. Like, your SIM card is even linked to your passport. No anonymity.



screenshot from the live streaming app huajiao (花椒)

information, and really highlighted the role that the Firewall plays in mediating + disrupting interactions.

“women hold up half the sky”

During my time in Shanghai, I spoke to a lot of people about the situation for women in modern China, and how it's changed over the past two decades. “Women hold up half the sky” - a famous quote from Chairman Mao, is seen to mark the first real era of women's rights in China, where, in pursuit of communist ideals, women abandoned traditionally feminine roles and worked equally alongside men (a right previously not afforded them).

After the decline of the Communism, women were encouraged to reclaim some of their femininity, and to leave the more masculine roles (including engineering) that they had worked in during that era. One woman I spoke to had gone from a chemical engineer to a bank manager - a respected so-called ‘pink collar’ position that many Chinese women see as an ideal job for a woman.

Although there are many women doing exciting work in new media tech, it can still be difficult for women who want to be involved in business. One architect that I spoke to, who had worked as a professional for many years described her frustration with the ‘glass ceiling’ culture at her practice.

zhang hanlu

I spoke to the art critic and writer Zhang Hanlu about her take on gender divisions in the media art scene. Swiftly reeling off several female Chinternet artists - a scene almost dominated by women - she also bemoaned the lack of feminist, socially critical net art coming out of China.

“One of the problems is a total lack of anonymity with platforms like WeChat... I try and get my friends to use Telegram (an app with end-to-end encryption) but they always just go back... it's so much more convenient.” The next generation of Chinese youth are also less likely to use a VPN (a virtual private network) to circumvent the firewall, instead relying on the convenience of the Chinternet they grew up with, without much input from outside. It won't be until art and tech interact in a more interesting way, she reckons, that Chinese new media will be a good tool to disrupt traditional ideas of gender.

TECH CONSUMPTION IN BEIJING

Beijing is very different to Shanghai. Large, straight roads divide the city into islands: the art district, the business district, the old center. The presence of the Chinese government was also much more tangible, with military posters adorning the subway, and huge neighborhoods of imposing administrative buildings. I spent a few days talking to different women involved in tech business + marketing, as well as artists with an interesting take on China's tech consumption.

youthology - post 90's youth, a rejection of gender

I made a visit to the marketing agency Youthology - a female-led research organisation that specialises in looking at 'millennial' Chinese youth consumption of media. They have recently published a report, entitled: "Chinese Youth Gender Report: body love, gender play" that explores changing ideas of gender identity in post-90's Chinese youth. Their conclusions were that this generation have begun to see much more nuance in gender expression, and markets needed to respond to a complex self-image. We talked about Chinese web fandom cultures, which use infinite specificity to subdivide and define different fan groups. This is a new phenomenon in China, but incredibly popular: and, like everything else on the Chinternet, moves at lightning speed.

funa ye + peep

I also spoke to the new media artist Funa Ye, who had worked with metaverse and has a particular brand of femme Chinternet aesthetic. I was particularly interested by her work Peep, a performance art piece broadcast over Chinese live-streaming platform *Rebo* (热波, literally 'heatwave'): "People thought it was so weird... a load of our performances got censored cause people thought it was porn."

Ye was also really interesting to talk to about her generation of female consumers - around 30-35 - who dominate that age group's use of social media, at least in middle-class Beijing. "Almost all the people buying stuff through O2O (services where products are brought to your door) are women."



different episodes of funa ye's *peep*



LING ZIHAN

Ling Zihan was one of my main reasons for visiting Beijing. I was introduced to her via Metaverse, as they had worked closely with her as part of her all-female startup accelerator TechBase. An outspoken advocate for women in business, she has been named one of the BBC's 100 women of 2015, and was also names in Forbes Asia's 30 under 30, and is a leader at Lean In China.

Her work at TechBase seeks to connect female-led startups with investment, and to provide role models for a new generation of female tech entrepreneurs. The most recent companies she's worked with include an app for new mothers, and a Deliveroo-style app for coffee shops.

Agnes: What do you see as the differences in tech business diversity between China and the West?

Zihan: For a start, the proportion of Chinese businesswomen is greater: there are around 20-30% women in business here, compared to about 10% or less in the US. The new media boom in the past 5 years has made a lot more opportunities for both men and women. This industry is so recent - it hasn't been designated as 'for men' yet.

Agnes: Are there particular trends you've noticed in female-led tech?

Zihan: Around 80% of female entrepreneurs focus on female-oriented products. Mainly because they don't exist yet - men in tech don't always know what women want. Women in tech better understand these customers' needs.

Agnes: How should the Chinese tech market be adapting to women?

Zihan: Well - 70% of online shoppers in China are women. They represent a huge consumer base, and large companies are beginning to realise this. The big companies are getting a lot better - Baidu has a lot of great female talent, and high up in the company.





Agnes: How does the Chinese education system affect prospects for women?

Zihan: People choose their major depending on economic trends. Girls in China have traditionally been raised not to take risks, but right now, in China, there is a high tolerance for failure. People born after the 90's have a different mindset, but there does need to be more action now... I think women are still holding back.

Agnes: What do you see as the main challenges for women in tech in China?

Zihan: The main problem that a lot of startups encounter is that the investors are all still male, and their vision of successful businesspeople is very male. Also, companies making female-oriented products may struggle to convince male investors of their usefulness, so there's a double discrimination. This is the reason I founded TechBase. It works with over 200 investors, they're invited as 'female-friendly'. The problem to be solved in big business is that men are doing the hiring - if one woman is successful, she will bring more.

MAKER DIVERSITY IN THE ‘HARDWARE SILICON VALLEY’

Towards the end of my time in China, I visited the city of Shenzhen. The fastest-growing municipality in China, Shenzhen was declared a special economic zone (SEZ) in 1980 and has since expanded from a small aggregation of fishing villages to China’s centre of technology manufacture.

Hardware for companies such as Apple, Samsung, Microsoft, Huawei and Intel is all manufactured here, often in large, high-security facilities unwilling to grant access to anyone who looks like a journalist. The factories - almost entirely staffed by women, whose ‘delicate’ hands are prized for small jobs - have been embroiled in a number of scandals, including a spate of suicides at the Foxconn factory in 2010. Unable to gain access to these factories, I travelled to Shenzhen to examine the tech scene that has grown up around them, earning the town the nickname of ‘Hardware Silicon Valley’.

shanzhai (山寨)

Shanzhai is a term coined to describe the fake tech manufacturers that sprang up in the late 90’s. Literally translated as ‘mountain horde’, shanzhai technology is characterised by kitschy, innovative fakes that leapfrog existing designs: “mashup hardware”. Shenzhen is the centre for shanzhai tech: workers leave factory jobs making computer hardware, adapting and make the same tech themselves, without the bureaucracy and at a fraction of the cost. The work of the Hacked Matter group is to highlight the truly innovative and remarkable nature of Shanzhai tech, and to promote the model of Shanzhai design and development as an alternative to the patriarchal, top-down Western model.

gongkai (公开)

‘Gongkai’ a term coined by hacker and hardware researcher **Bunnie Huang**, refers to ‘Shanzhai-style’ open-source, where leaked and copyrighted are shared and edited openly with the maker/hacker community in Shenzhen, enabling iterative and evolutionary design



shenzhen-based maker and 3d printing expert naomi wu

DAVID LI + S

David Li - a collaborator on the Hacked Matter project - has, for many years, been running the Shenzhen Open Innovation Lab (SZOIL), focusing on Shanzhai and gongkai (open-source) practices. He has long been outspoken against the Western model of Intellectual Property as a means for technological development.

Agnes: How have you seen China change since the 80's?

David: In China, there's been a drastic change in viewpoint but no real change in the underlying conditions. It's like that joke: in 2006 you see a photo of a girl with a soldering iron and it's called 'sweatshop labour' - now she's a 'young maker'

Agnes: What do you see as the big difference between somewhere like Shenzhen, and Silicon Valley?

David: In California, 40 year old white male venture capitalists select a couple of 20 year old white male developers, and the rest just keep trying to work at Snapchat or Google, and after 10 years their skill-set is dead. Shenzhen is the opposite. You have an image of a VR designer? Well, he's over there - he's 40, he looks like a farmer. It's a lot more diverse here.

Agnes: What's the difference in design practice?

David: Well, if you go to Apple, or Google, you get into this system called "Design Thinking", where everyone gets into a group and sticks a post-it on the wall with an idea. And then you spend 18 months and millions of dollars on consultants and you whittle it down to one post-it. In Shenzhen, everyone in the meeting takes one post it, goes and makes it, then comes back in a month and tries to sell it. The tech gets evolved, not selected. The risk gets spread out, and once you have a form, a market is created.

Agnes: Do you have any examples of these markets?

David: Well, one of my favourites is the hoverboard: before them, you had Segways and the Solar Wheel. There was a Kickstarter for self-balancing hoverboards, but they were too complex - they never took off. Anyway, this Hangzhou company

ZOIL



liked the idea, ripped out all the control and started selling them - then so did everyone else. But at that point they didn't really have a name: they were just this "Anonymous Popular Object". And that's what the Shanzhai do - they make those anonymous popular objects. Selfie sticks! All these cultural items just created by iteration.

Agnes: A lot of people in China are now buying phones from cheap giants like XiaoMi - do you think the Shanzhai phone has a future?

David: When the Chinese market for fake phones dries up, one opens up elsewhere: there's a lot of very specialised phones going to Russian, African and Indian markets: phones with an 18 month battery, phones with local branding.

Agnes: What do you see as the future for maker movements?

David: The global maker movement is still too caught up in tech. In places like Shenzhen, you don't need to know how a capacitor works. There is open source hardware everywhere. Sure that kind of education is important, but there's too much emphasis. Just grab it and apply it!

huachangbei aesthetic



tiny shanzhai phones

practices that thrive at the edge of legality. This take-it-or-leave-it attitude to Intellectual Property is seen as one of the key features of Shanzhai tech, and what makes it so different to the more controlled 'open innovation' practices in the West.

huachangbei

Huachangbei is the giant 15-by-15 block market district in the East of Shenzhen, home to some of the largest tech markets in the world and filled with Shanzhai tech. Working your way from the top to the bottom of the hill, you start off in buildings selling single chips (real, fake, gongkai, improved), and reels of capacitors, and end up in 10 floors of drones, phones and speakers, with everything else inbetween. The most famous Shanzhai tech is the phone. Walking around the markets, we found iPhone clones a third of the size of an iPhone 5, phones with five cameras on the back (all with different focal lengths), a phone shaped like a pack of cigarettes with room for real cigarettes in the back.

shenzhen makers

There is a growing maker scene in Shenzhen, which mingles with the Shanzhai, taking advantage of the rapid pace of hardware manufacture. Maker spaces and startup accelerators are springing up all over the town, the oldest and largest including David Li's Shenzhen Open Innovation Lab (SZOIL), and Seeed Studios' ChaiHuo Hackerspace. These spaces are starting to attract big names like Intel and Microsoft, who are starting to realise the revolutionary power of Shanzhai innovation.

3D printing expert Naomi Wu is one of these makers - a vocal advocate for the inclusion of East Asian women in tech on Twitter- highlighting the sexism and racism rife in tech and maker culture - she declined an interview for fear of her work being distorted by journalists.

workshop with tsinghua shenzhen

I met a class of Tsinghua new media arts course from the Shenzhen campus at SZOIL for a 'Shanzhai' workshop. The students were interesting and diverse, with a balanced gender ratio, and from multiple disciplines: some had come from engineering backgrounds, some business, some from art and design. The workshop included a talk by two Shanzhai cataloguers: people who circulate the Huachangbei markets and Shanzhai workshops, making new catalogues every couple of days, a reflection of the insane pace at which this market moves, then students designed their own 'Shanzhai' tech by selecting components, presenting their ideas at the end of the session.

WHAT DID I FIND OUT?

It was hard to find any absolute answers to explain gender ratios in Chinese tech - or even matching estimates of the true proportion of women, and the role they play. For one thing, even a 5-year generational gap is enough to completely change a set of perceptions, both about technology and in the role women play in it. It was also difficult to have a conversation about gender with many engineers (and even artists) that I spoke to - and our ability to do that in the UK is something that makes me hopeful for challenging our lack of diversity.

One of the reasons for the gender disparity between China and the UK that kept cropping up, however, is the relatively young and organic tech scene. Groups like the Shanzhai defy the Western expectation of who gets to be a technologist, and what design looks like: if these groups continue to grow then we will see more exciting and diverse technology and engineers coming from China.

lessons for the UK

Here in the UK, we desperately need to dismantle the gendered nature of engineering. In doing this we need to change how we think about what engineering actually is, what engineers do, we might well be able to encourage a new generation of female technologists.

Although the idea of 'marketing' tech to girls is a) fraught and b) overly simplistic, there is a need to understand how to make young women feel that the study of technology is relevant to them, and vice versa. Emphasising the skills that girls are constantly told they should have and value - such as social communication and artistic creativity - when talking about technology is one way to do this: not by making technology pink.

The approach used by educators such as David Li (SZOIL), Anna Greenspan and Christian Grewell (both NYU Shanghai) was refreshing and exciting, and allowed young women to thrive in a technical environment that also placed heavy emphasis on art and new media. The power of the female artists I have met in defining new internet (Chinternet) aesthetics and trends on these platforms is really exciting, and in closing the art/tech gap, we may well see a closing of the gender gap, too.



texting + cycling in shenzhen



ying miao's work landscape.gif

MANIFESTO+

FUTURE WORK

Some of the most constructive experiences of tech diversity in China were found talking to female students and lecturers who had benefitted from creative tech programs such as those run at Tsinghua and NYU Shanghai. These programs (and the inclusion of arts under the 'STEAM' umbrella) are slowly becoming more common in higher education, though there is still a sorely lacking interaction with art and tech for girls of a younger age. This research has confirmed and developed my understanding of communicating science to the public, particularly young women. In summary:

Femme tech is great tech! People can and do make exciting technology for young girls.

Western tech is not the only tech! Talk about exciting technology from places that aren't America/Europe

Never underestimate the abilities of school age girls, especially not when you make things for them/speak to them.

Girls are not automatically alienated by technology! Girls are alienated when they think tech isn't for them. In the UK this is a challenge - we have 200 years of tech 'not being for girls'. But it can be overcome (not by just making the tech pink)

Emphasise skills that girls are always told they are good at: creativity, visual communication, social communication as essential for making good new tech (they are!)

cambridge women's campaign: 'girls, tech and maker culture'

Inspired by my time in China, I have spent this term setting up a campaign with the Cambridge Women's Campaign that seeks to run new media art + tech workshops aimed at girls aged 12-16. These workshops involve maker societies, lecturers and speakers from the university, and seek to provide a fun and engaging series of workshops. The first of these - taking place this January - is a workshop on creative robotics.

wechat+

Towards the end of our stay in China, myself and my partner collaborated on an online artwork for the BREW+BLEND festival, held in Shanghai. The piece examines the implications of socially defined credit ratings, and is online at: www.agnescameron.info/wechat+

the Cambridge Radical Technology Series

As part of my work with the Women's campaign, I have been granted funding by the Engineering Department to run a talk series examining how new media technologies interact with ideas of gender, race and sexuality. My time in China provided a lot of the inspiration for the themes explored, including the future of touch, and feminist cybersecurity. The talks will run from February-March next year, and hope to instigate a more critical discourse on technology in Cambridge. The full programme can be found on: www.agnescameron.info/radical_technology.

future work and proposals

I have applied to a number of institutions, including UCL and MIT to continue research on public communication of science, with a focus on the public understanding and interpretation of communications networks. Strongly informed by my experiences with network technologies in China, this work will seek to address the gendered power imbalance shaped by the 'black box' containing our ideas of network technologies.

ultimately...

New technology in China is anyone's guess - the climate is changing every day, and heightened government involvement and influence in the tech scene - especially in ecosystems like Shenzhen - could well squash this diversity as much as they could make it flourish. What's for certain is that the radical approaches to open innovation taking place across art/tech currently make Chinese tech scene one of the most vibrant and interesting in the world.

If we learn anything from China, it is that a more evolutionary+organic approach to tech might well supersede the current monopolistic, IP-driven culture in the west. China is no feminist utopia, but the mixing of art+tech is creating a vibrant and engaging new generation of young female technologists.



the author in shenzhen

bel element
to host
the border

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and
science

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