

# Humanitarian Technology Inclusive Entrepreneurship

Designing for the invisible communities

**Dr. Albert Ko**

BSc, MSc, Mphil, PhD, MHKIE, MIEEE

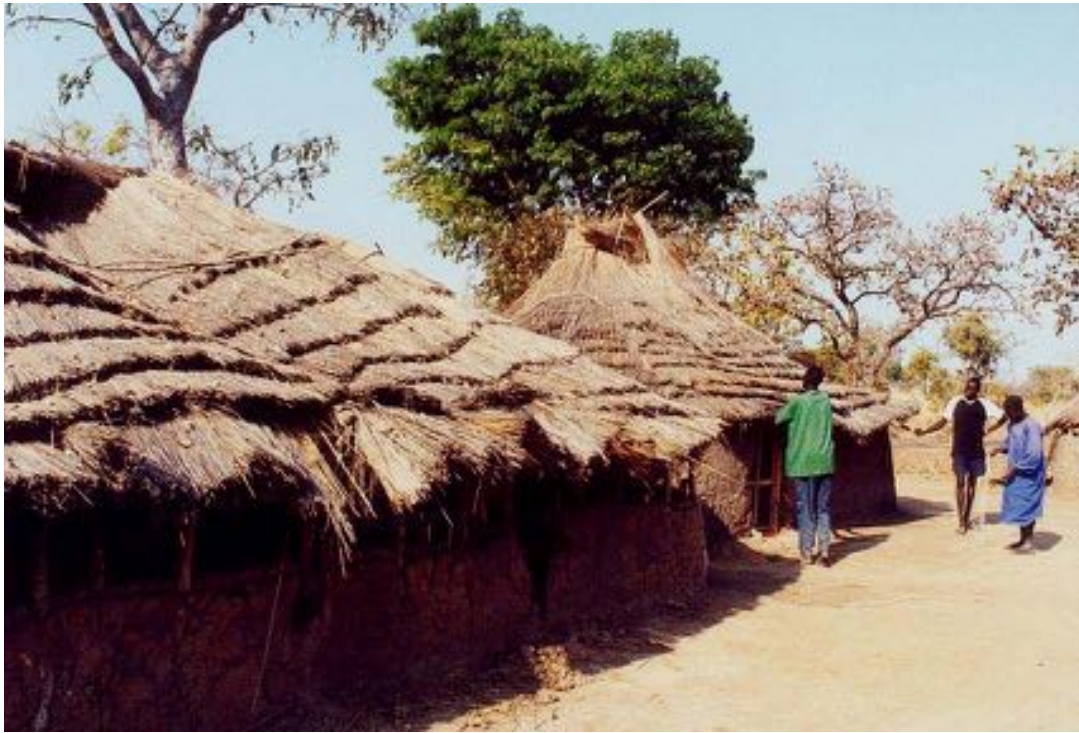
Director of Lingnan Entrepreneurship Initiative

Director of Service Learning

Lingnan University, Hong Kong

# Tell us something about you...

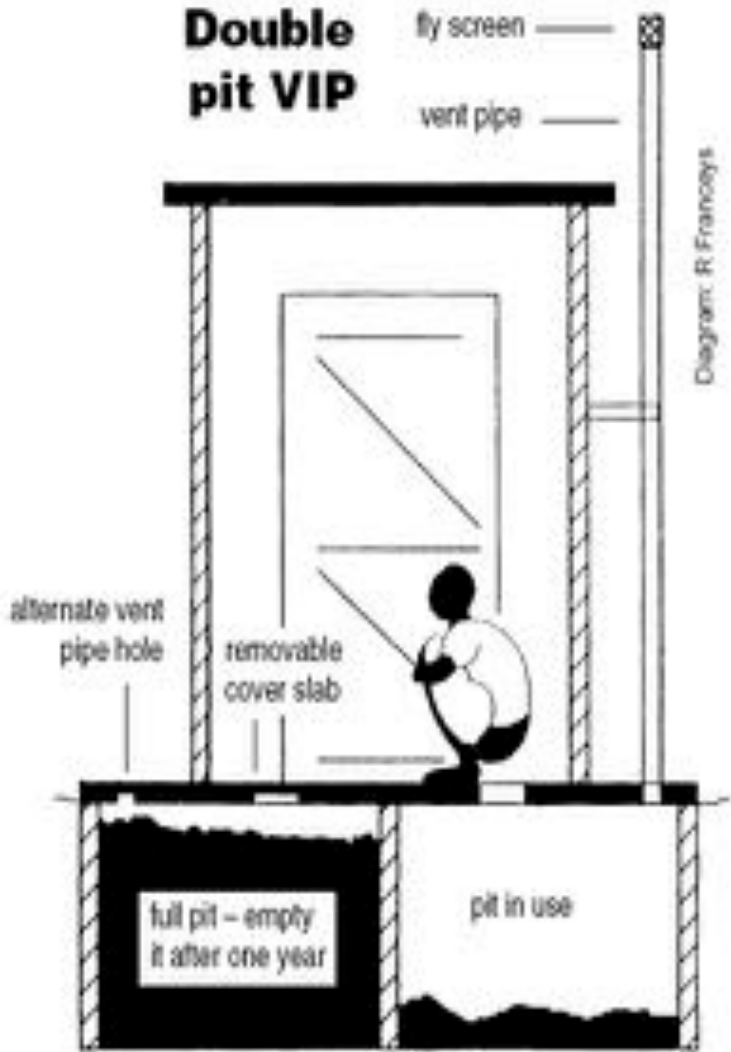
- What is your name?
- Where are you from?
- What is your major/department?
- What problems do you want to solve?













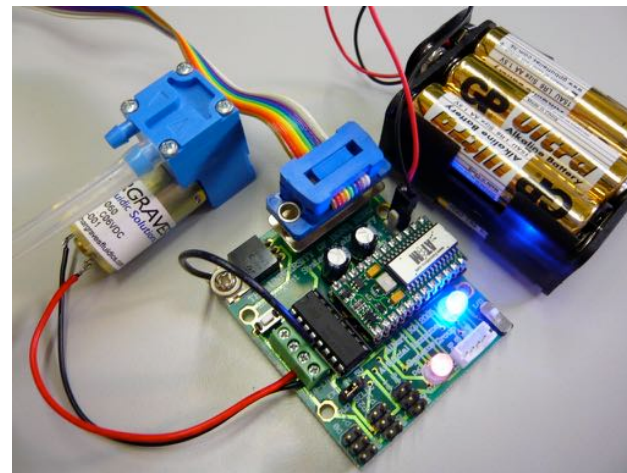
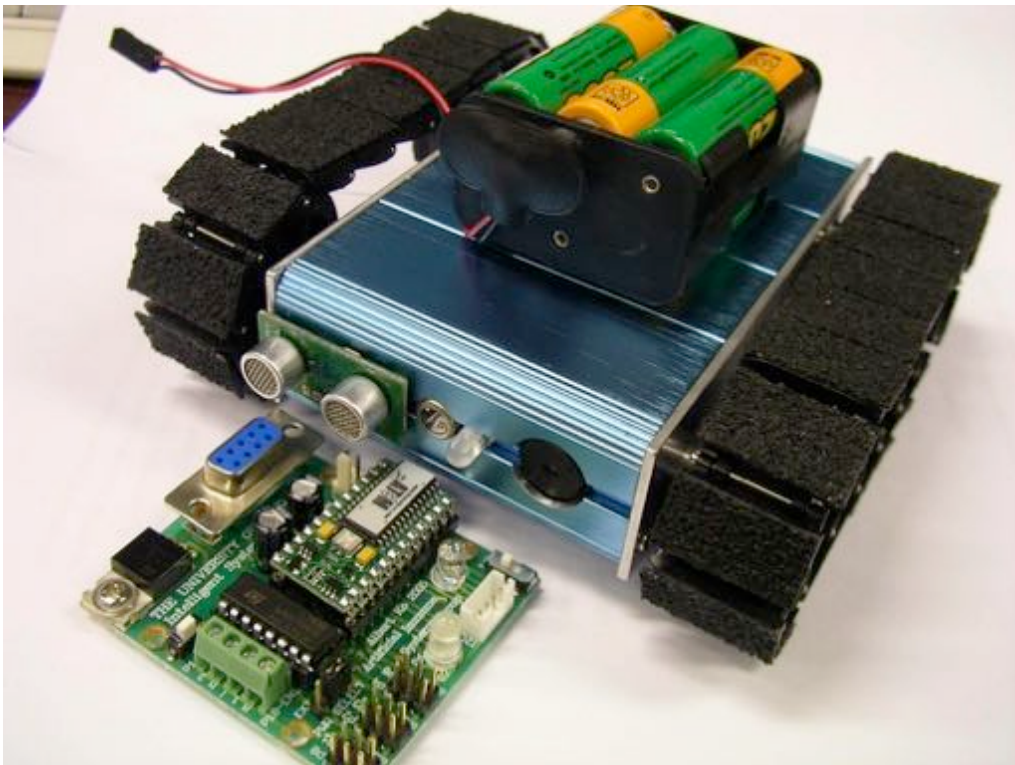


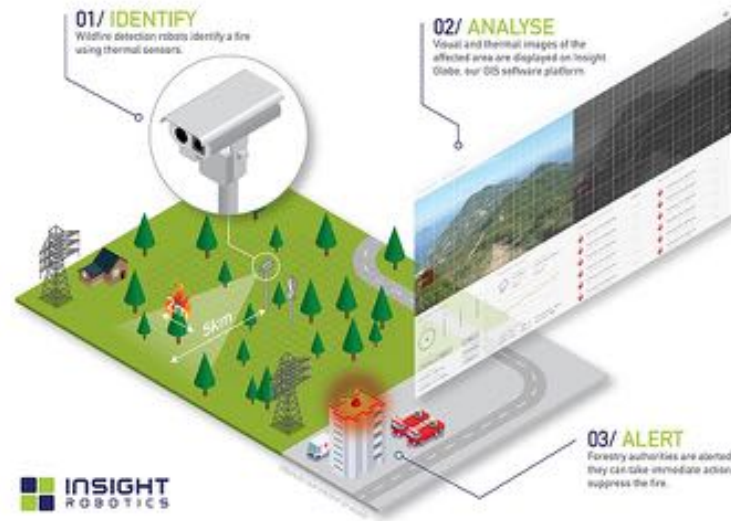


# Modular Robots



# Search and Rescue Robots





Insight Robotics is a pioneer in early, automated natural resource and infrastructure risk detection.

Their wildfire detection robots rely upon the global network of IBM SoftLayer to capture large volumes of geospatial data – used to protect over 2500 km<sup>2</sup> of high fire risk land around the globe.



Latest Notifications	Alerts	Recent History
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected
Possible fire detected	Possible fire detected	Possible fire detected

Camera Projector

Weather Report (Local)

Recent Notifications: 0 Alerts

Possible fire detected



隨心所欲的是夢想，滿途荊棘的才是理想



我們不必改變世界，只要不被世界改變，但夢想需要堅持。

最佳劇本 十大最受歡迎劇作

# 留守太平間

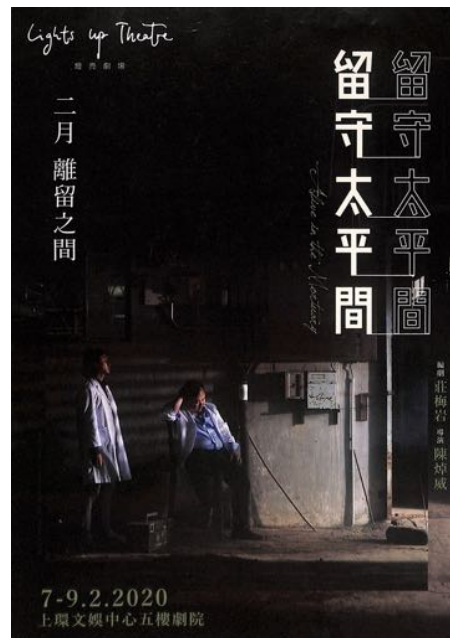
Alive in the Mortuary

15-17, 22-24/11/2012 6pm  
25/11/2012 3pm

香港話劇團黑盒劇場 (上環文娛中心)

票價 \$200

門票現已於各城市電腦售票處、網上及信用卡電話訂票熱線發售。



Lights up Theatre

# 留守太平間

二月 離留之間

7-9.2.2020  
上環文娛中心五樓劇院



# 留守太平間

香港話劇團黑盒劇場

15-17, 23-24/11/2011 6pm  
25/11/2011 3pm

門票現已接受優先預訂

訂票熱線 2374 7434 / [www.hktdc.com](http://www.hktdc.com)

illumina

Bedtime 啟迪時光

多元化睡前活動  
開拓孩子多樣潛能



高永賢

專業機械工程師

孩子自2015年1月開始飲用ILLUMA



Start your protection planning now to achieve  
both in the future!



# Tell us something about you...

- What is your name?
- Where are you from?
- What is your major/department?
- What problems do you want to solve?



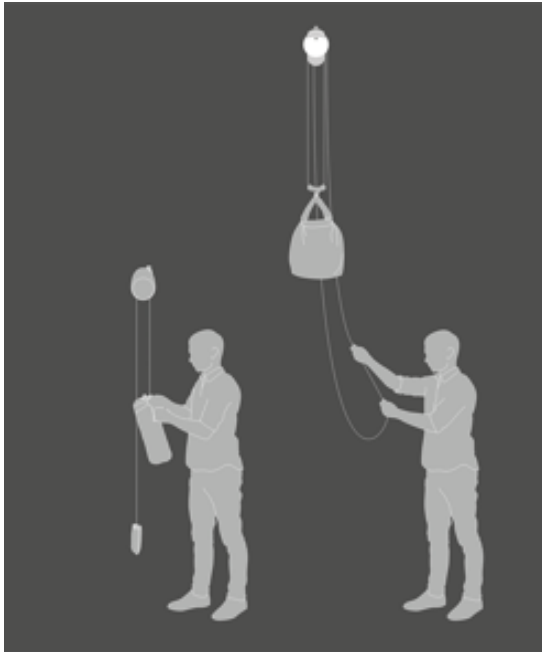
## Q-Drums

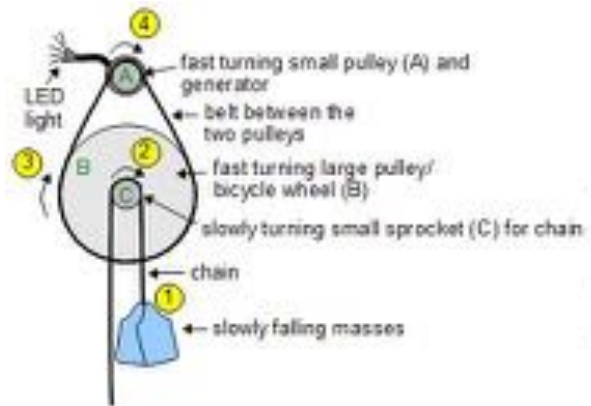
Examples: Water





 GRAVITYLIGHT





The whole purpose is to have the masses fall slowly over a long period of time while causing the generator to turn fast. So the slow falling speed has to be converted to fast generator rotational speed.

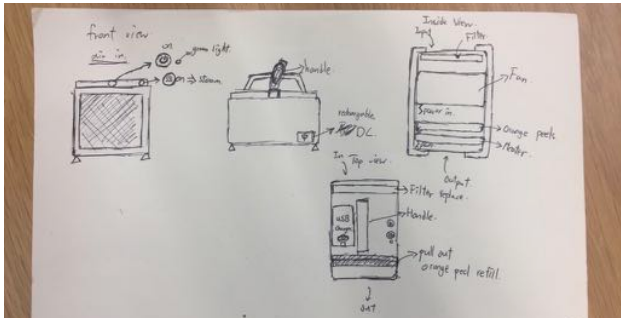
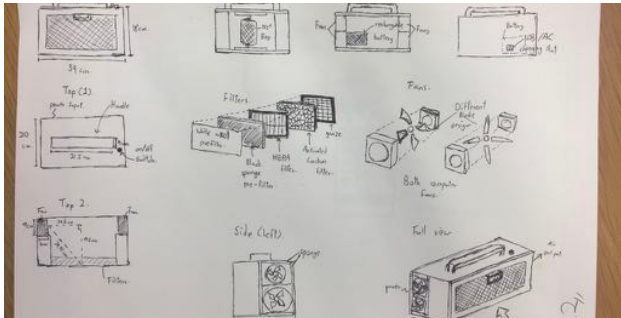
- 1 The mass falls slowly under the downward pull of gravity.
- 2 This slowly turns the small sprocket that's attached to the large pulley.
- 3 The outer edge of the large pulley is moving faster than the small sprocket.
- 4 This faster movement causes the small pulley with the generator attached to also turn fast.





# 嶺大生「三慳」機 淨化劊房空氣

## 慳錢慳電慳位 成本百多元 手提易搬動



香港文匯報訊（記者 樓嘉禧）以創新意念改善生活環境，並不是科技人才的專利。針對香港劊房居住環境狹窄、空氣流通問題，嶺南大學3名人文及商科背景的學生，從零機械知識學起，運用創意思維，針對為劊房戶設計一款成本只百多元的手提式空氣清新機，其效能亦與坊間空氣清新機功能相若，但價格則便宜最少六七成。現時已有一間非政府機構與他們接洽使用該清新機。3人未來將會繼續優化該清新機，從而達到「慳錢、慳電又慳位」的功能，希望能有效解決劊房的需要。

嶺大早前成立了「嶺大創業行動」計劃，為學生提供跨界的平台，與不同社區及商業機構合作，令學生能將所學知識與文化，鼓勵學生運用創意思維，以解決社會問題，同時亦回饋社會需要。計劃亦包括為學生提供以色列和瑞士的實習機會。這3名學生創製「知識轉創」基金，以及個人對參與聯合國設計挑戰法定知識大學占優系列，都是該計劃的成員。

3名參與「嶺大創業行動」的嶺大生，包括就讀心理學的李嘉禧及吳紀恆，以及來自汽車設計與經濟學系的卓成益。雖然並非理科背景，但他們從對內的心理學課程中，認識到對他人解決問題的興趣，並積極「嶺大創業行動」，學習將可將知識化為行動，將該設計產品幫助有需要的人。有嘉禧分享說，他們曾參與設計劊房戶產品，其間曾與大部分劊房內只有一個窗

戶的劊房，屋內極多汗臭味（實屬「空氣非常不流通，導致空氣內含有毒氣，不少人有哮喘及有毛病，所以希望設計出能將空氣清新機和放在劊房室內空氣質量。無理科底子 設計多挑戰。他續說，由於華人均在晚上或夜間休息，所以希望設計出能解決晚上開窗，換氣需要。用非專業力，他們製作成體積約20厘米x18厘米x20厘米，由4個電池供電，3層濾網及1個迷你風扇組成的空氣清新機，與一般家用空氣清新機，方便劊房居住者室內搬動。

機內的濾網可以促進室內空氣循環流通，把室內空氣過濾機內的濾網及活性炭層將各種有害物質過濾或吸附，從而達到淨化空氣的目的。嘉禧與吳恆的空氣清新機功能相若，但成本百多元，比坊間一般約300多元



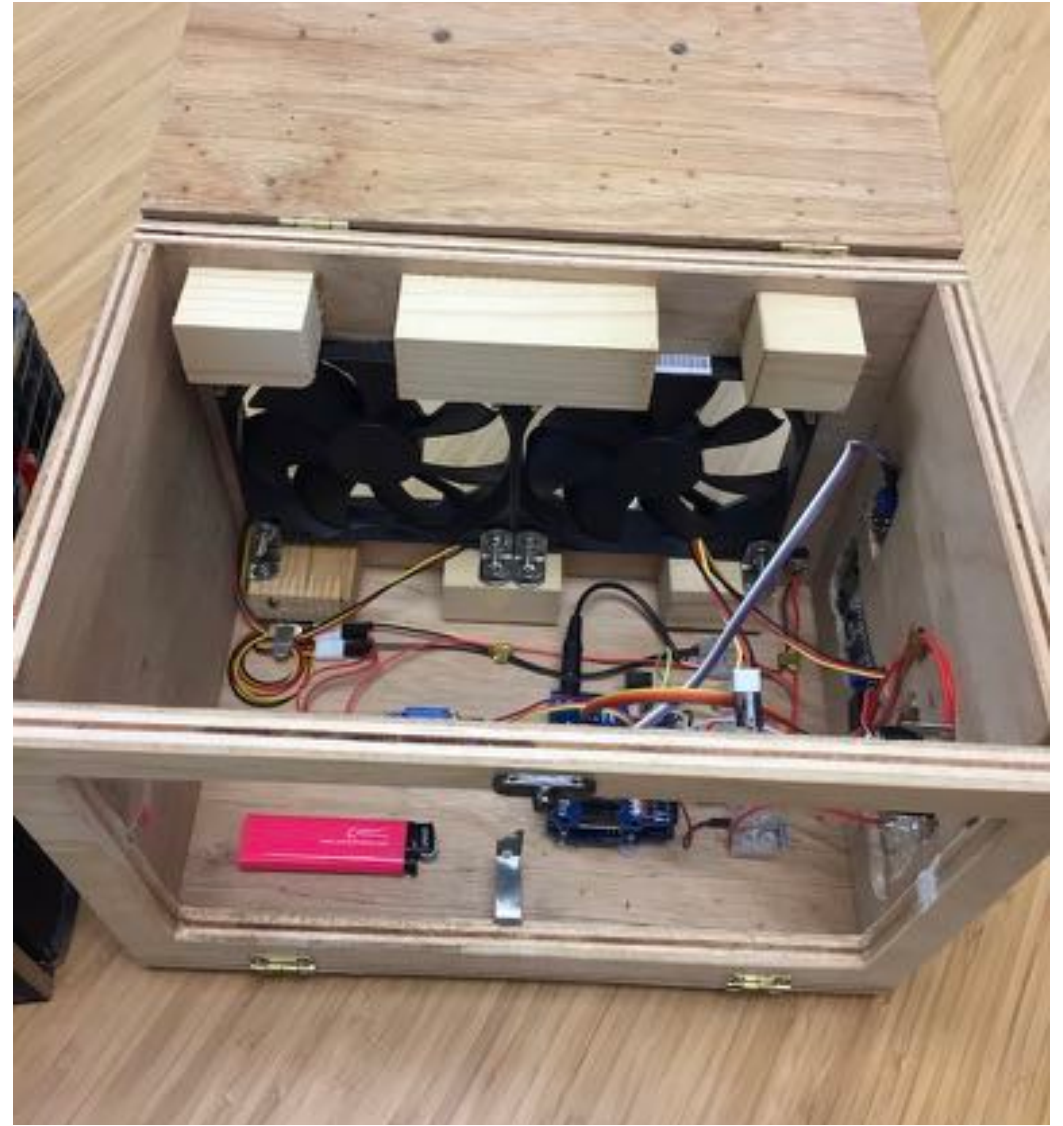
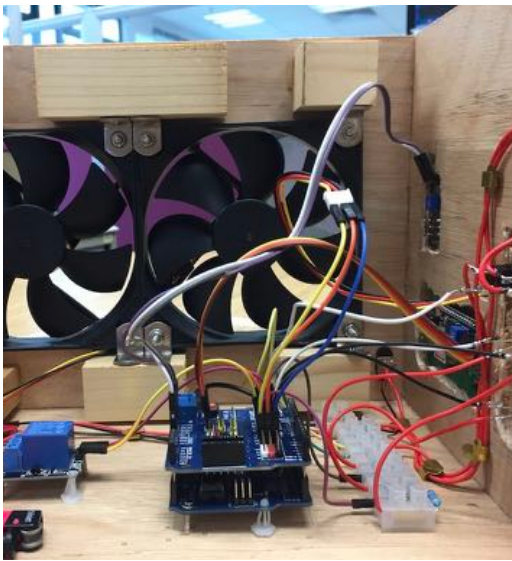
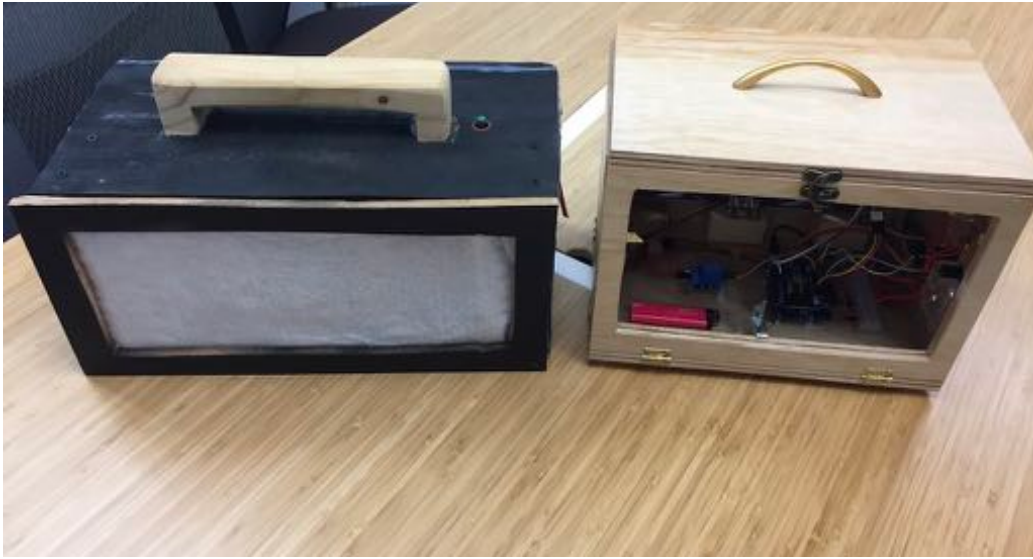
吳紀恆（左）、李嘉禧（中）及卓成益（右）構思設計適用於劊房戶的手提式空氣清新機，提供劊房的空氣質量。香港文匯報記者樓嘉禧攝



3層濾網（左）及與木框（右）構製「聆學聆聆」，利用木工的機器，將不平整的木塊，切割成平整的木框。嶺大創團

是動木，與不平整的木塊，切割成平整的木框，再裝成空氣清新機的外殼，由於之高級少接觸有木工的機器，這需要「聆學聆聆」，把該心法與會者製作中受領。目前該空氣清新機採用6粒電池操作，可以持續運作約17個小時；3人現時雖未有具體數據報告，在製作的過程中，最困難的說

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# Project Ultra Violite



主辦機構 ORGANIZER  
Lingnan 嶺南大學  
University of Hong Kong

協辦機構 CO-ORGANIZER  
LEI  
HKU SWSA Department of Social Work and Social Administration The University of Hong Kong  
香港大學社會工作院社會行政學系

資助機構 FUNDED BY  
香港明愛 Caritas HONG KONG  
香港賽馬會慈善信託基金 The Hong Kong Jockey Club Charities Trust  
馬會與社會攜手共創和諧

**【紫礙線計劃：劏房戶免費快速消毒服務】**  
**Project Ultra Violite: Rapid Disinfection Service for Sub-divided Units**

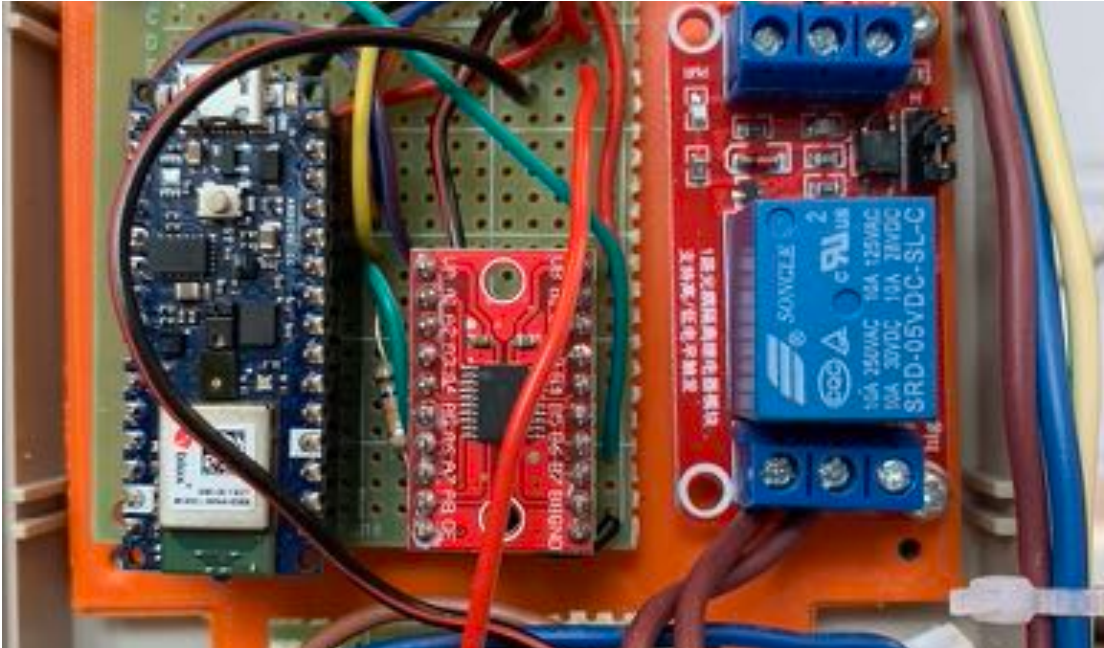
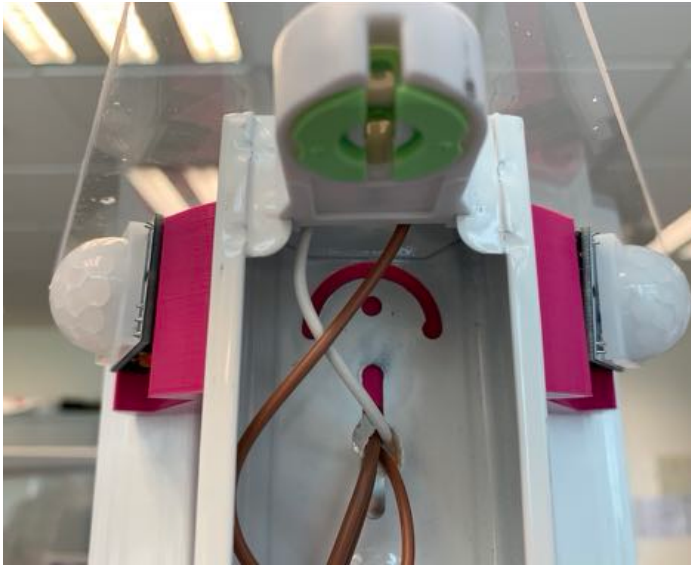
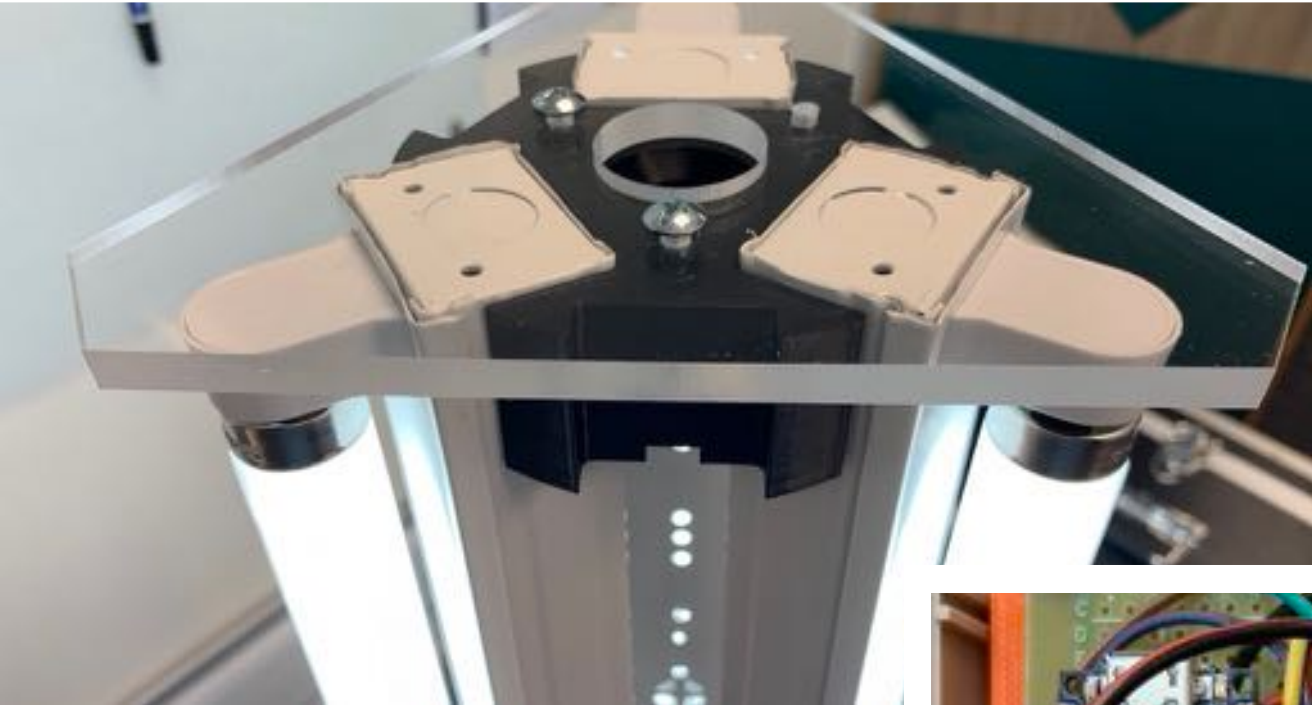


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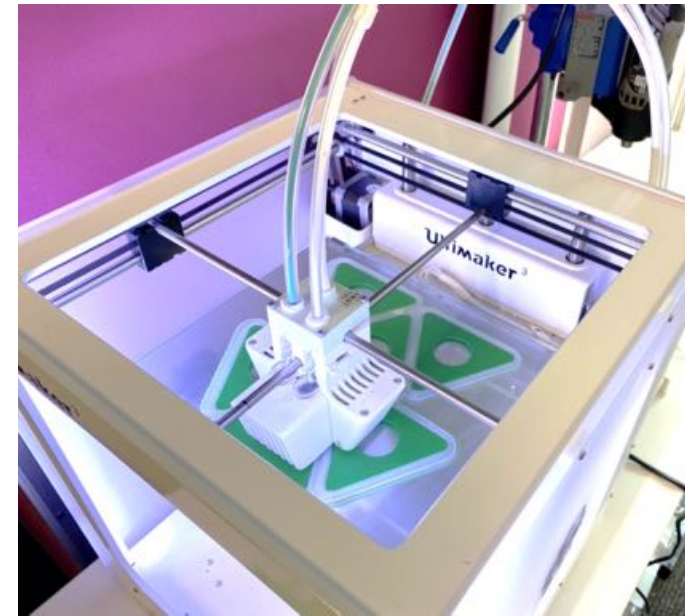








# 100% MITM



# Portable UVC Disinfection Kit

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- UVC Devices x 3
  - Tripods X 3
  - Philips Drivers x 1
  - Remote Controller x 1
  - Remote Receivers x 3
  - Extensions x 3
- 

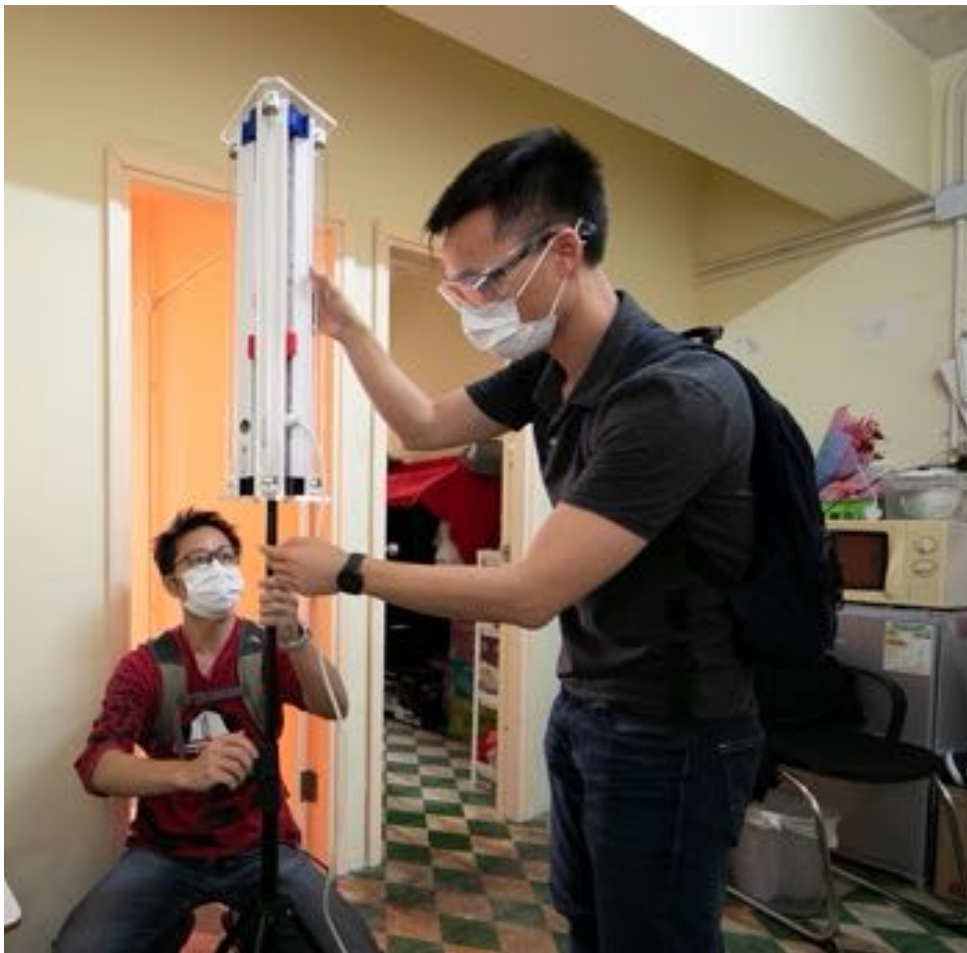


# 智能感應及遙控開關



# Volunteer Recruitment and Training







## 衛浴空間會接受多重消毒





## Outcome

- Provision of disinfection services to [1045](#) SDU
- Provision of useful health information to [6235](#) individuals
- High public attention after [36](#) times of media exposure
- Production of survey and research materials Fully disclosure of the disinfection device for [Open COVID Pledge](#)
- Training of [120](#) health ambassadors for the service
- Provision of health education to [6235](#) individuals

# The Scaling Up

Open Source	Volunteer Based	Community Based	Company Startup	Licensing
<ul style="list-style-type: none"> <li>• Mechanical Design</li> <li>• PCB Board Design</li> <li>• Code</li> <li>• Volunteer Training Material</li> <li>• Construction Manual</li> <li>• Maintenance Handbook</li> <li>• Online Technical Support</li> </ul>	<ul style="list-style-type: none"> <li>• Volunteer Training Workshops</li> <li>• Emergency Trouble Shooting Hotline</li> <li>• System Production</li> <li>• Repair &amp; Maintenance</li> <li>• Project Administration</li> <li>• User Recruitment</li> <li>• Logistical Arrangement</li> </ul>	<ul style="list-style-type: none"> <li>• Volunteer Training Workshops</li> <li>• Emergency Trouble Shooting Hotline</li> <li>• System Repair &amp; Maintenance</li> <li>• Project Administration</li> </ul>	<ul style="list-style-type: none"> <li>• Register a company</li> <li>• Find Partners</li> <li>• Find Investors</li> <li>• Marketing</li> <li>• Staff Recruitment &amp; Training</li> <li>• Logistics</li> <li>• Partnership</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• Transfer or Lease License</li> <li>• Supply Products</li> <li>• Initial Training</li> <li>• Professional Technical Support</li> <li>• University Endorsement</li> <li>• Product Enhancement</li> </ul>
<p>Advantages</p> <ul style="list-style-type: none"> <li>• Promotes humanitarian spirit</li> <li>• No resource commitment</li> <li>• Fast scale-up</li> </ul>	<p>Advantages</p> <ul style="list-style-type: none"> <li>• Full control of quality</li> <li>• Speedy upgrade &amp; pivot</li> <li>• Easily incorporate new research, promotion and social activities</li> </ul>	<p>Advantages</p> <ul style="list-style-type: none"> <li>• Minimal administrative commitment</li> <li>• Less inter-community infection</li> <li>• Requires little expertise for scaling up</li> <li>• Minimise transportation cost</li> </ul>	<p>Advantages</p> <ul style="list-style-type: none"> <li>• University pride</li> <li>• High risk, high gain</li> <li>• Business track record</li> </ul>	<p>Advantages</p> <ul style="list-style-type: none"> <li>• Business track record</li> <li>• Knowledge Transfer</li> <li>• Potential gain</li> <li>• Least administrative work</li> <li>• Product upgrade research</li> </ul>
<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• No control of what people might do with it</li> <li>• Risk of reputation</li> </ul>	<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Liable for system reliability</li> <li>• Heavy administrative work</li> <li>• Heavy logistics costs</li> <li>• Hard to scale-up</li> </ul>	<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Liable for system reliability</li> </ul>	<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Nightmare in university environment</li> </ul>	<p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Complicated licensing process</li> <li>• Liable for system reliability</li> <li>• Liable for uncontrollable partner mistakes/misconducts</li> </ul>



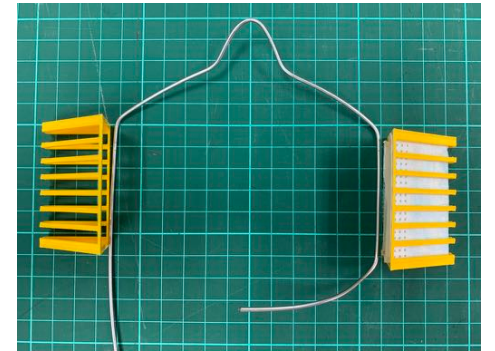
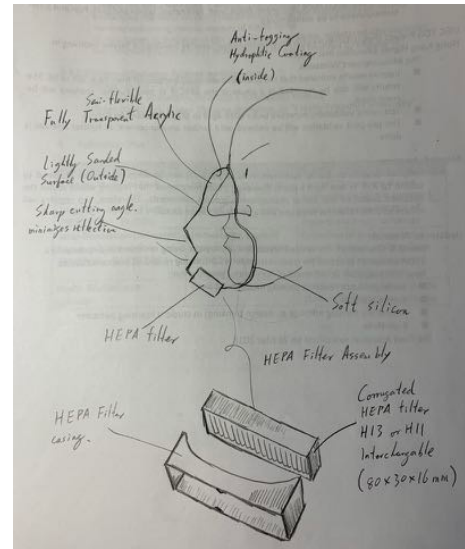
Lingnan Entrepreneurship Initiatives  
12° Mask

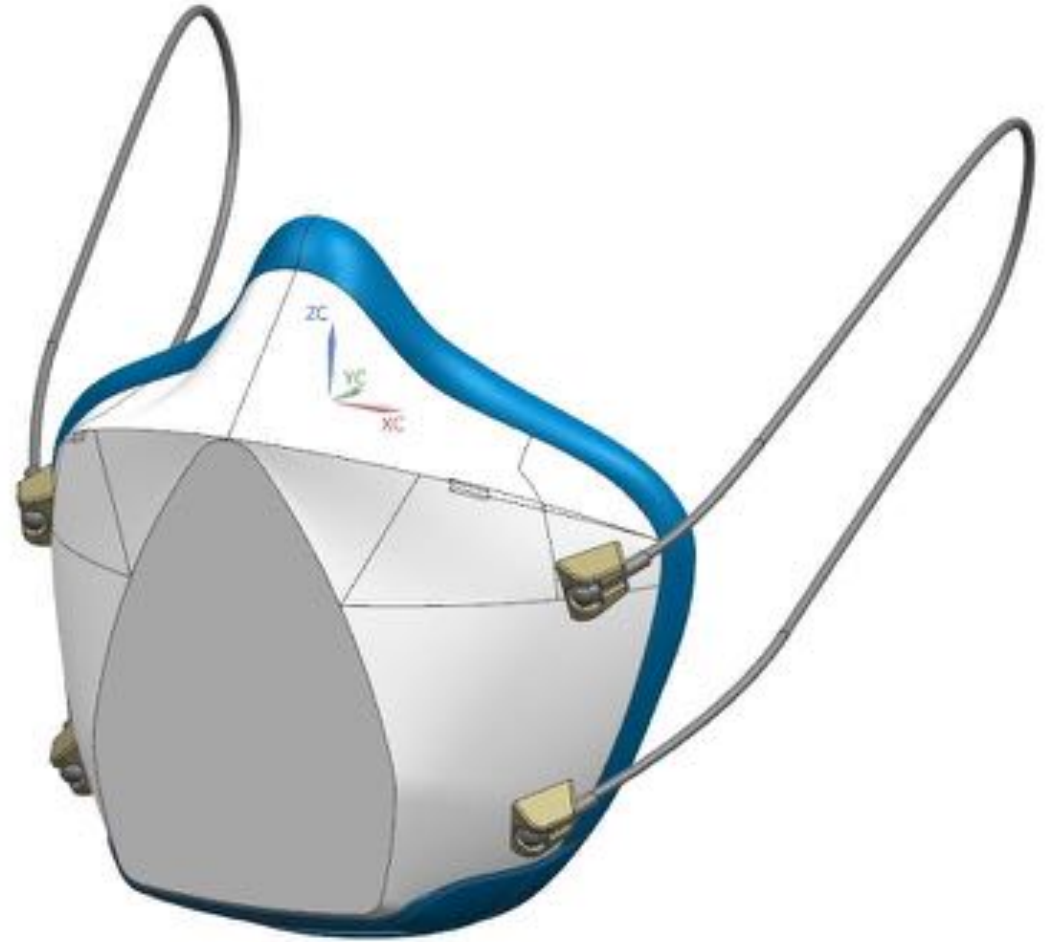


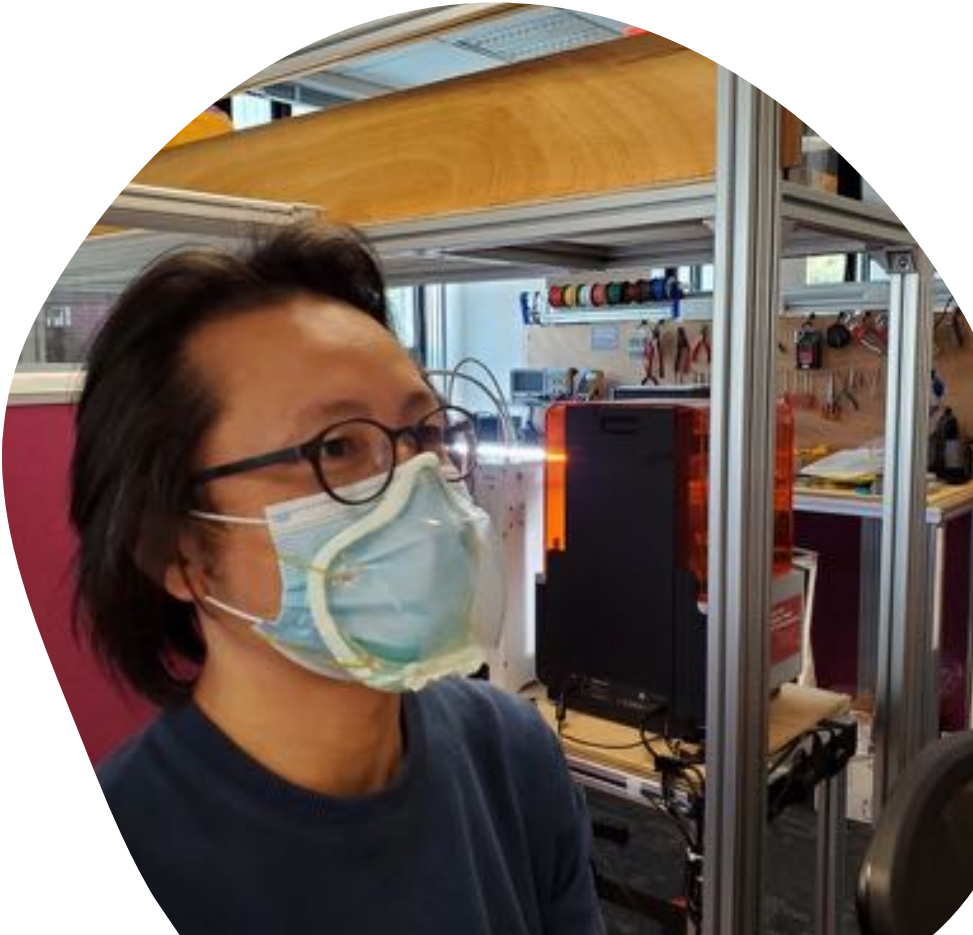
## Existing “Transparent” Masks

- No air filtration
- Low breathability
- Small transparent windows
- No reflection control
- Fogging
- Lack flexibility for microtia users













Existing “transparent” masks either lack filtration system or suffer from heavy reflection, fogging, small see-through windows, and low breathability. 12° Mask adopts innovative design and mature material to provide an effective and affordable solution.

**Ultra-Low Reflection**

Inspired by the geometry of stealth jet fighters, face shield of the 12° mask combines flat polygonal panes and low protrusion surfaces to minimize reflection.

**Renewable Antiviral Coating**

Durable and wipeable with alcohol and water.

**Laugh Out Loud**

Flexible silicon seal provides comfort fit and accommodates enthusiastic facial expressions.

**Hybrid-loops**

Reconfigurable elastic bands converts between ear loops, head loops and cross loops on the fly.

**Wide Viewing Angle**

Unobstructed side panes allow panoramic view of the wearer’s face and lip movement.

**Quick Release Anchors**

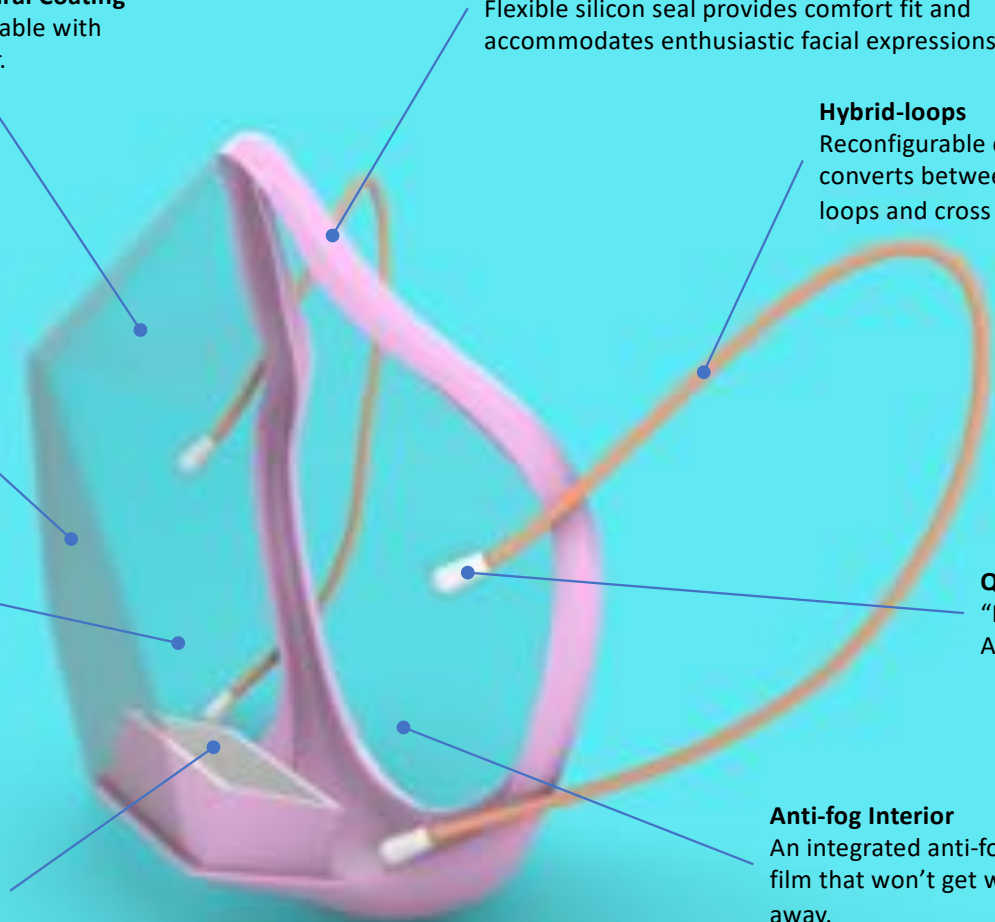
“Re-loop” anytime. Anywhere.

**Reliable Protection & Breathability**

Disposable low-cost H13 HEPA Filter blocks 99.95% of viruses while being 30% more breathable than surgical masks.

**Anti-fog Interior**

An integrated anti-fog thin film that won’t get washed away.

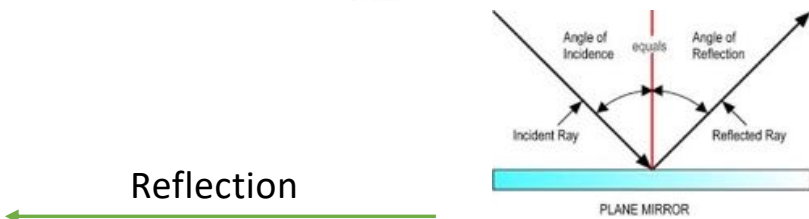
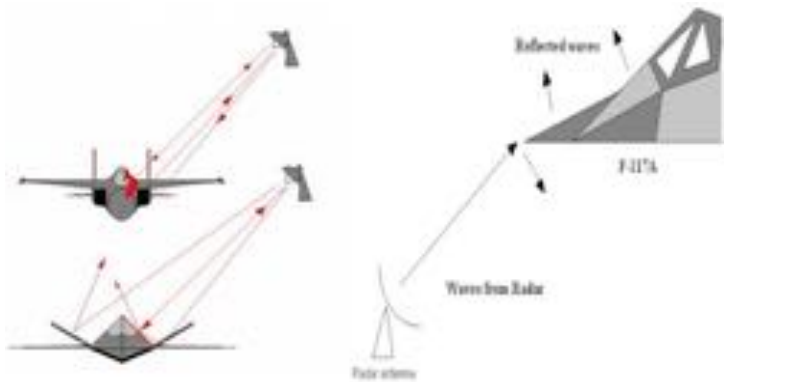
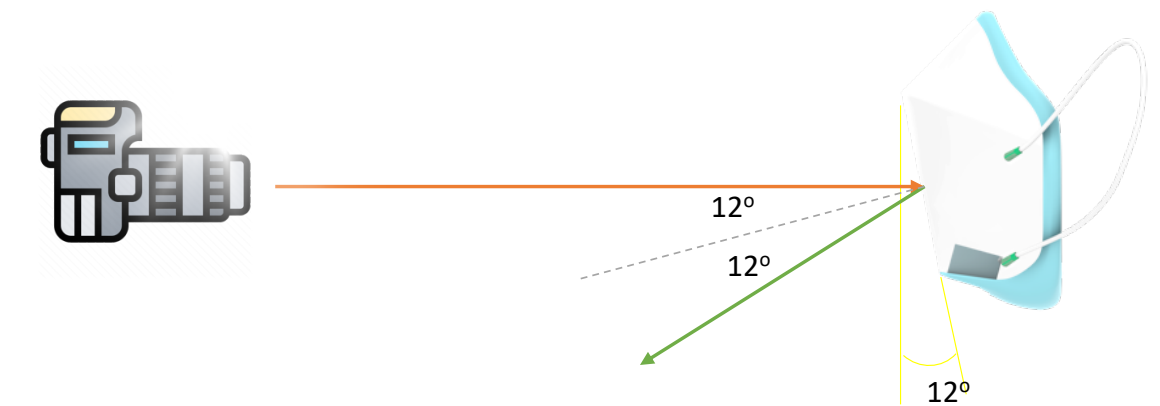
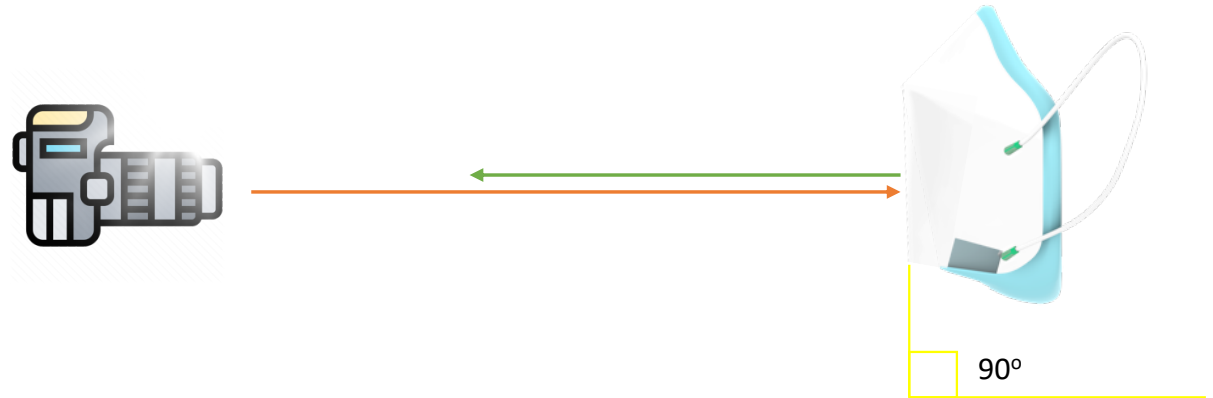


Patent Pending

**FOGGING AND REFLECTION** management are two most important components in transparent masks design.

**Simple Geometric Magic**

The 12° offset on the frontal pane effectively deflects undesirable reflections from head on camera flashes and overhead lights downward. The patent pending feature is most desirable in classrooms, offices, and indoor facilities where ceiling lights are most common.

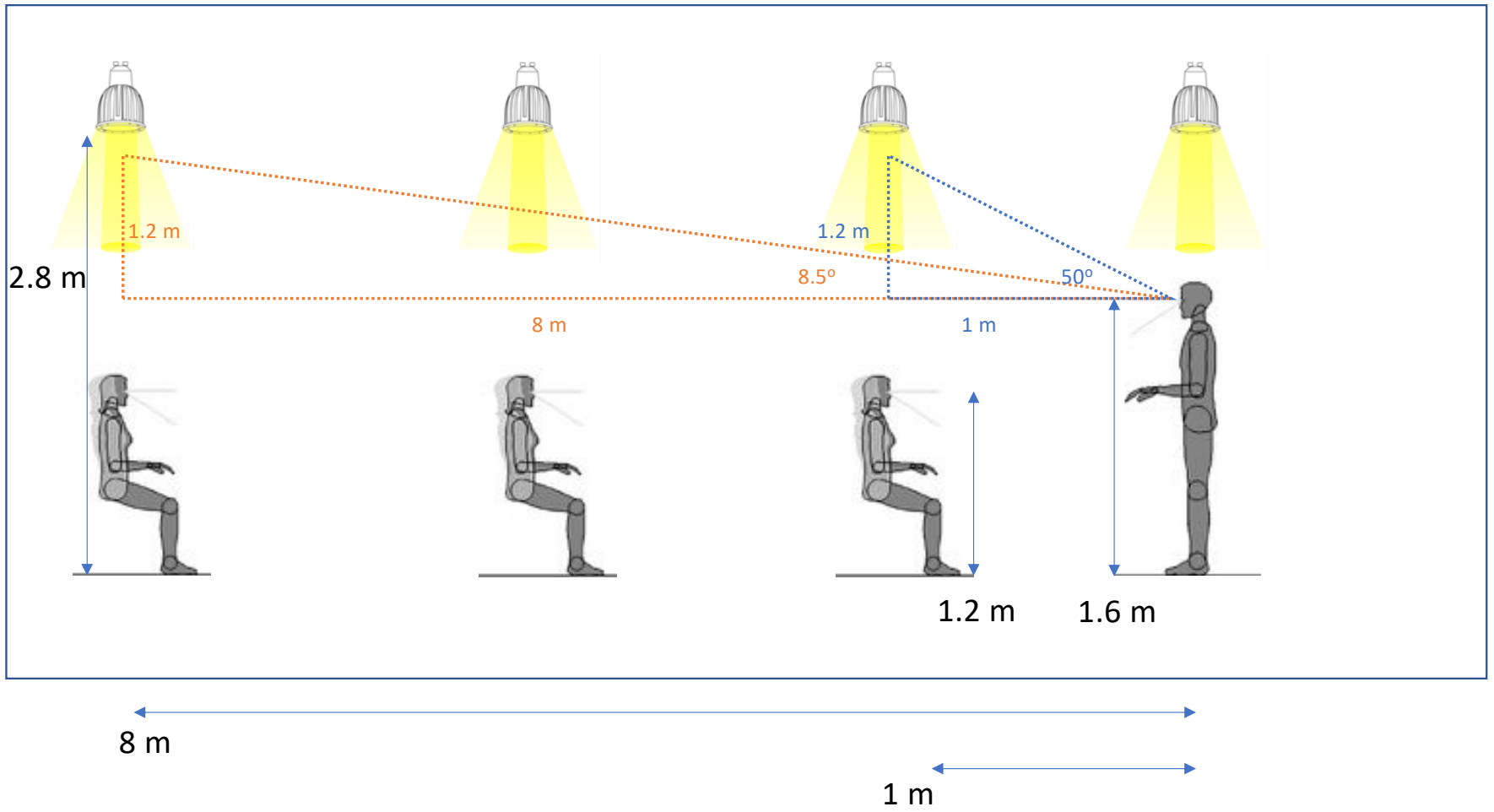


Reflection  
←

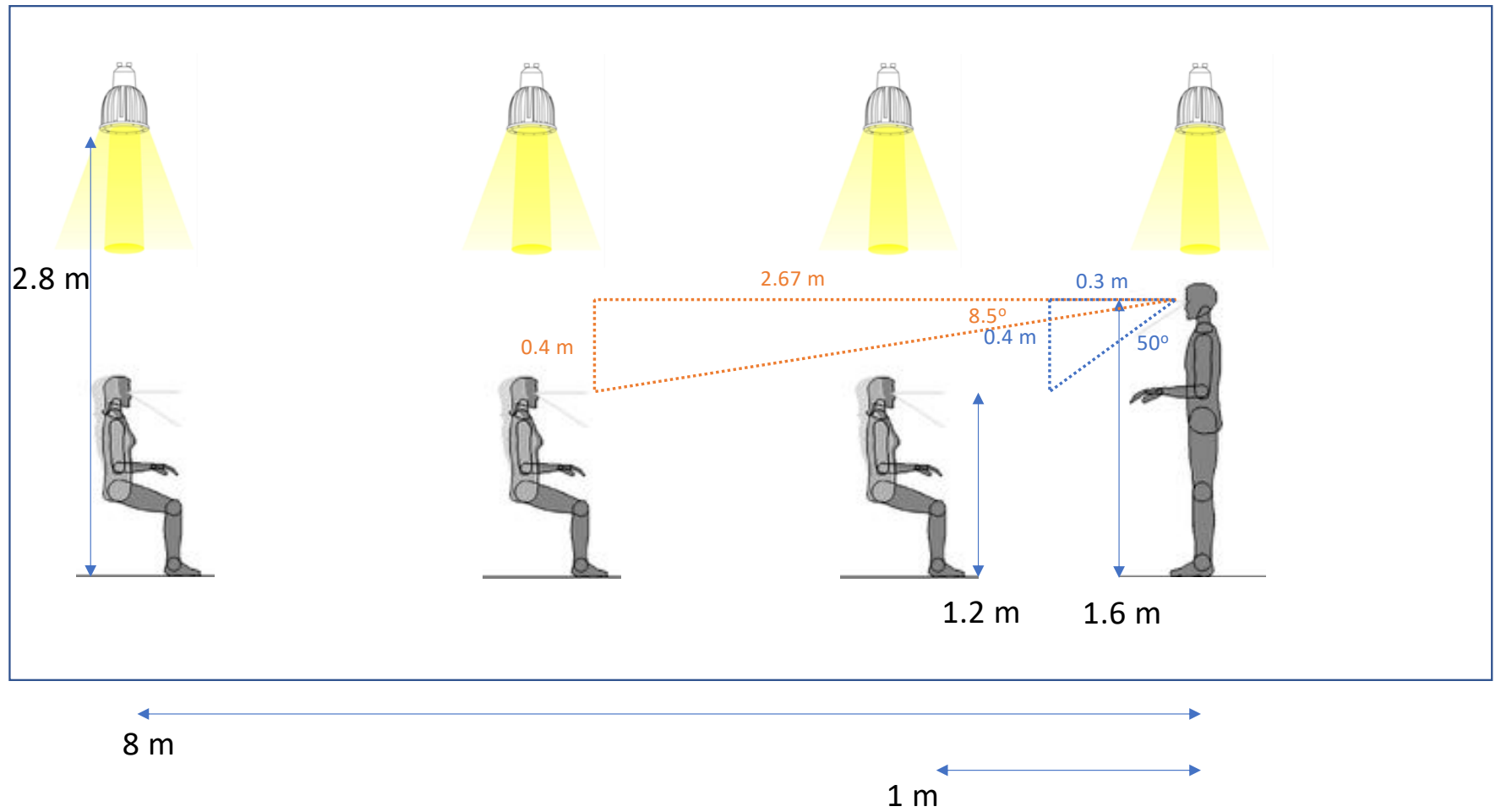
Incident Ray  
→

The angle of incident equals the angle of reflection.

67 – 84 sq.m

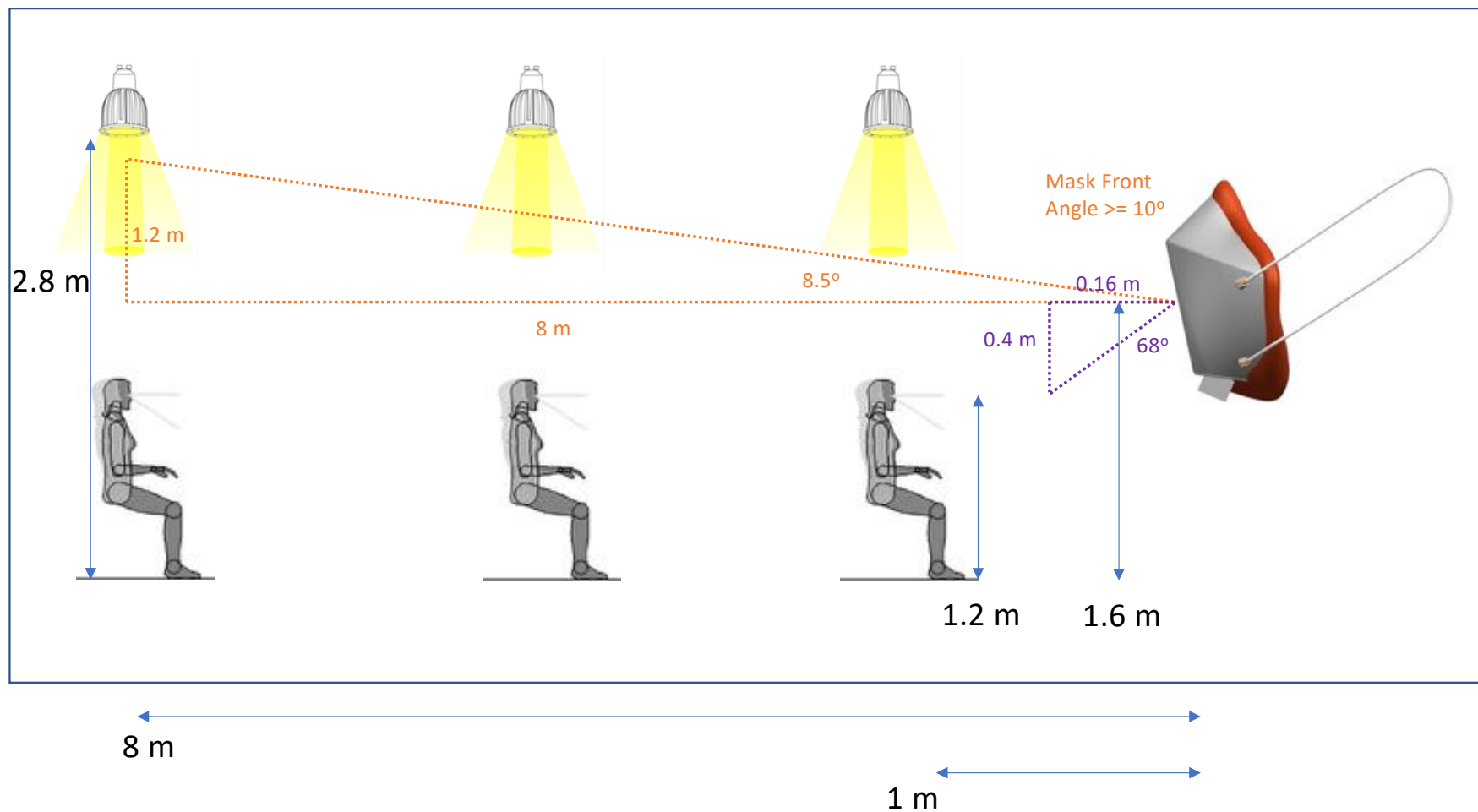


學生坐於老師前方 2.67 米以內均有機會被口罩的反光影響



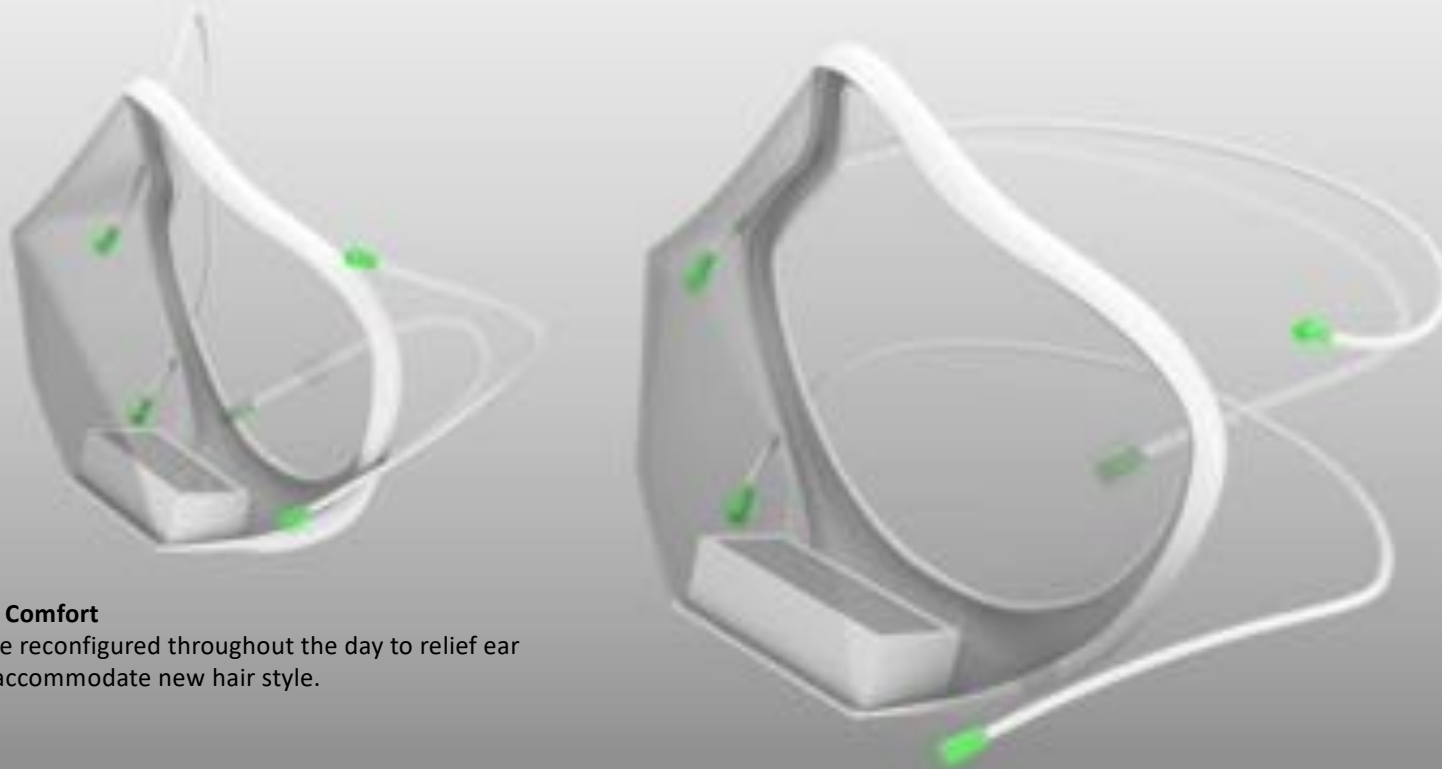
# 12° Mask

嶺大全透明過濾口罩的傾斜角角度設定為12度，有效將光線折射向地下。只要學生坐於老師前方0.16米以外已經不會被口罩反光影響。



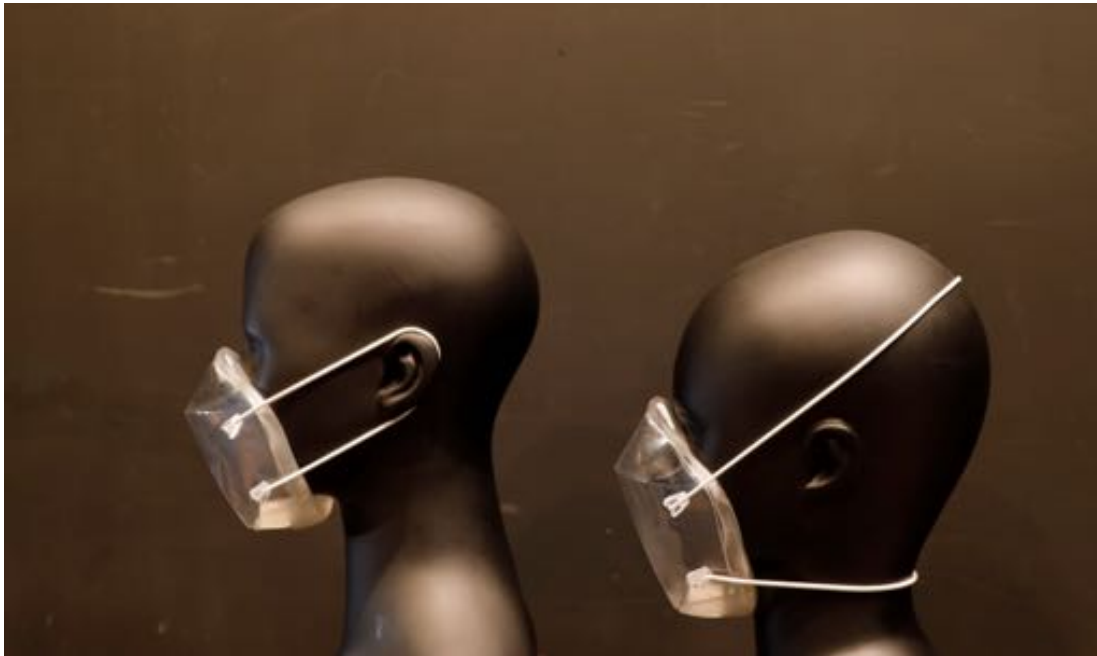
**INCLUSIVE Design**

High elasticity bands allow microtia users and hijabi to reconfigure the ear loops to go around the back of the head or around the headscarf.



**All Day Long Comfort**

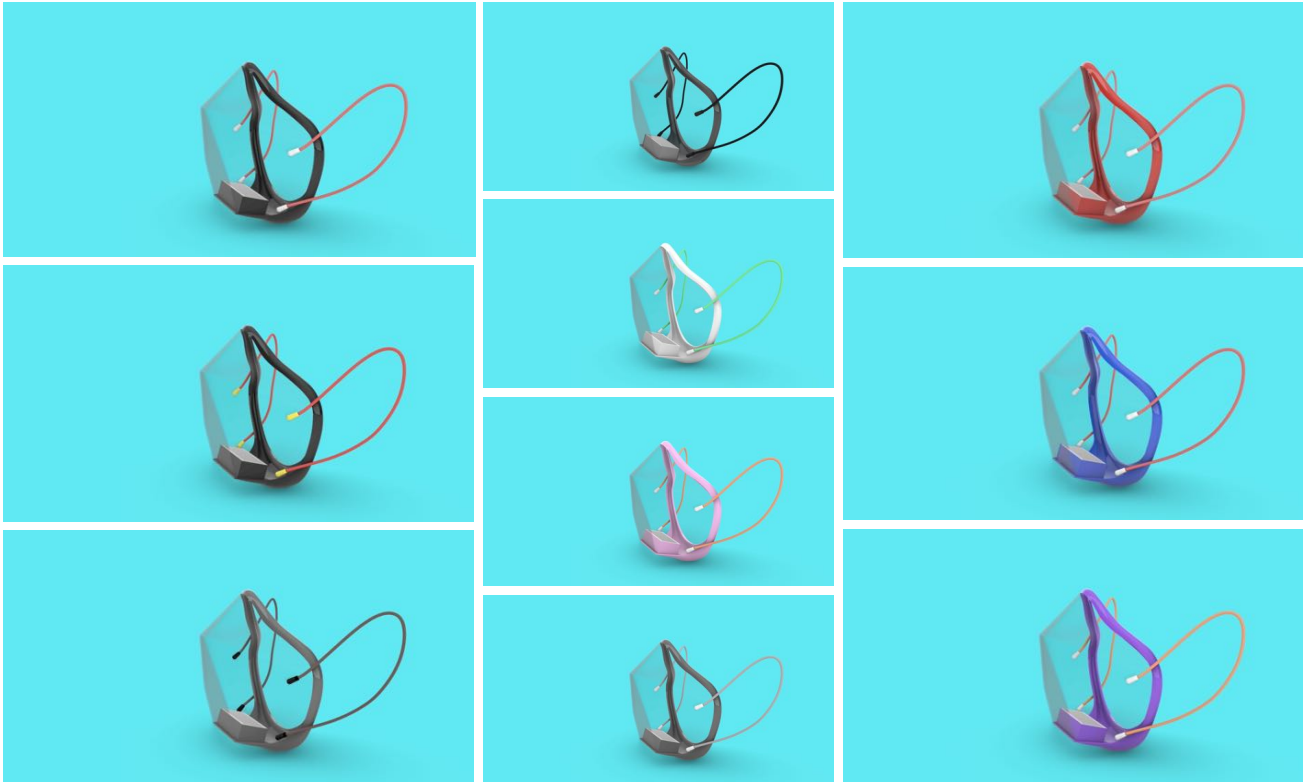
Bands may be reconfigured throughout the day to relief ear irritation or accommodate new hair style.





### Go Playful or Professional

All-black and all-white models available for more professional image.



# Functionally Fashionable



### Unlock Your Phone

Works with major face authentication technologies.

### Wear Your Colours

7 frame colours and 12 more for the bands.

### Light on Your Face

Combination of PET and silicon means durability and lightweight.

### Easy to Clean. Thoroughly

With the filter removed the entire mask can be soaked in soap water.

### Heal the World

Ignite a smile in others with one of yours.

# The Way Forward

- Raise \$1.5M to start production in 2021 and complete 100,000 units in 2022
- Provide discount (or free) units to the underserved
- Collaborate with Government, Public sector, service and retail industry to introduce 12° Mask to our daily lives.
- Design a kid-version for 8 years old and above



# Setup Budget

	Item	Unit	Unit Cost	Total	Remarks
	Engineering Cost	1	\$420,000	\$420,000	For designing mould, overseeing production and certification, and designing kid-size version
	Moulding	3	\$120,000	\$360,000	
	Testing & Certifications	3	\$80000	\$240,000	Filter certifications, impact test, bacteria test, etc.
	Production Cost	10000	\$50	\$500,000	Mask, filter, bands, packaging,
	Marketing	1	\$150,000	\$150,000	
			Total	\$1,670,000	

# Product Donation

	Unit	Unit Cost	Total
A	30000	\$100	\$3M
B	20000	\$120	\$2.4M
C	10000	\$150	\$1.5M



Questions?

# Material

- Anti-fog
- Antiviral
- Ultra-low reflection

## Shape Retention

The face shield made of 100% recyclable PET is light and firm. It has good ductility to survive daily bumps but won't collapse on the user's face when breathing heavily during workout.

## H13 HEPA Filter

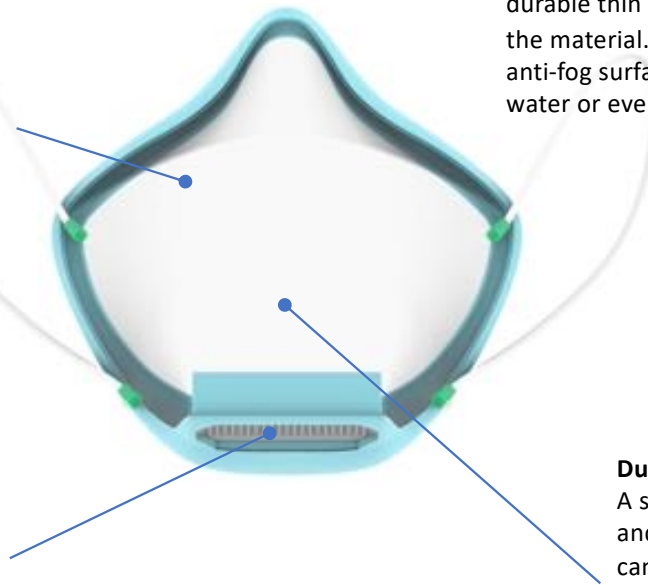
The pleated H13 filter allows 30 times more airflow within the same compact vent design. Each filter lasts up to two weeks.

## Integrated Anti-fog Shield

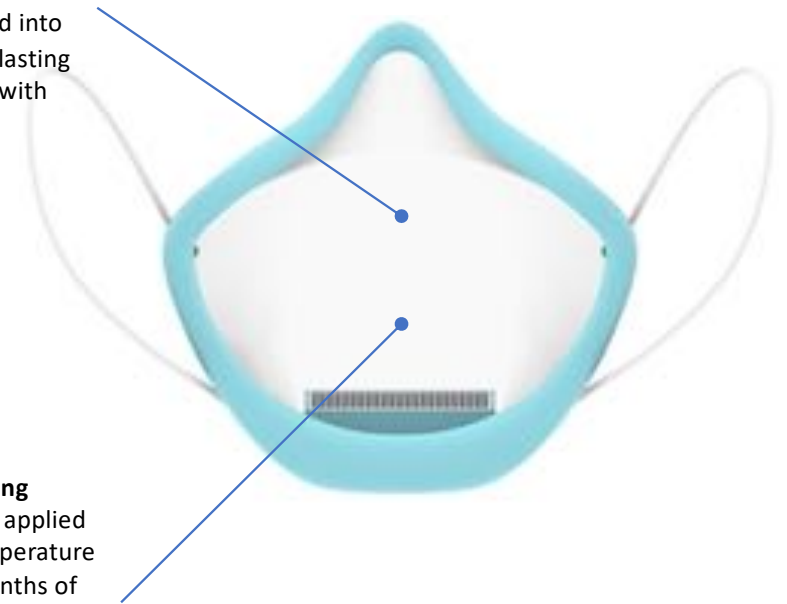
Nearly all commercially available masks rely on anti-fog spray, which wears off quickly. 12° Mask employs an ultra-durable thin film that is integrated into the material. The result is a long-lasting anti-fog surface that is washable with water or even alcohol.

## Durable Antiviral Coating

A solid film that can be applied and cured at room temperature can provide up to 8 months of antimicrobial protection. The surface is wipeable with water, bleach and up to 70% alcohol.



FRONT



BACK

# 「全透明過濾口罩」主體及配件

