

第 五 十 五 屆
T H E 5 5 T H J O I N T S C H O O L
S C I E N C E
E X H I B I T I O N
聯 校 科 學 展 覽

探索科學無限可能 Science in Creativity
攜手追尋活力創新 Synergy between Vitality





The 55th Joint School Science
Exhibition Preparation Committee

PRESENTS

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EDITOR'S NOTE

2022 has been another year since the pandemic broke out, like everywhere around the world, the city and we were left directionless and stressed for a while. Fortunately, everything is getting better gradually and our exhibition arrived in time successfully.

Being the Publication Secretary of the 55th Joint School Science Exhibition Preparation Committee, I was flattered but honoured to take on this post. Throughout my entire terms of office, there have been memories covered with tears and sweat, a schedule filled with hectic workload and vexations accompanied by the aim to strive for perfection.

Nonetheless, there are also memories filled with laughter, cheers, courage, and support. Looking back on these 10 months, the experience I gained did not just broaden my horizons but also made me a better person.

My deepest gratitude goes to Anson and Ella for making this booklet with me, their tremendous support means a lot to me. We now proudly present this brochure to you all.

The success of the exhibition belongs to every member of the preparation committee. This is the time of the year to witness the fruits of blissful achievements!

Stephanie Tam
Publication Secretary
The 55th Joint School Science Exhibition Preparation Committee



蘇樺偉 Mr. SO Wa-wai

BBS, MH

The rapid development of modern society depends on scientific breakthroughs on stereotypes, bringing about changes in different fields. As is the theme of the Joint School Science Exhibition "Vitality", the imagination of vitality can not only assist ordinary people to break through limitations by science but also enhance the mobility of the disabled through scientists' inventiveness by utilizing technologies to help them run faster and walk further. Throughout my entire athletic career, the development of sports sciences has gradually been attached to importance, like nutrition and dietetics, dynamic control, etc. Innovative breakthroughs are made by the utilization of scientific knowledge in those fields. The development of science has also boosted the Para sports to vitality. For instance, wheelchair racing, which was carried out with ordinary wheelchairs in the past, has developed into professional racing wheelchairs. Thus, the vitality in science has noticeably created new insights for society and the disabled.

I would like to thank the Joint School Science Exhibition for years of hard work, training the students' cogitation, inspiring their enthusiasm for science since secondary school and cultivating social leaders in the new generations. My gratitude goes to the students in the 55th Joint School Science Exhibition Preparation Committee for organizing this exhibition and I wish the 55th J.S.S.E. a grand success!

現今社會發展迅速，有賴科學家在不同領域中突破固有觀念，帶來改變。誠如是次聯校科學展覽主題「活力」，活力的想像不單是透過科學來協助一般人突破限制，更可以透過科學家對殘疾人活動能力的想像，利用科技來協助殘疾人跑得更快、走得更遠。在我運動員生涯中，運動科學發展亦日漸受到重視，例如營養學與膳食、動力控制等，都利用科學知識來將人體的機能推向新突破。殘疾運動的發展都有賴科學發展，變得更有活力，例如輪椅競速賽事，由過去利用普通輪椅進行，發展至今已研發出競速專用輪椅，可見科學上的活力為社會和殘疾人帶來新景象。

感謝聯校科學展覽多年來的努力，由中學開始訓練同學的思維與啟發對科學的熱誠，培育出一代又一代的社會領袖，感謝第55屆聯校科學展覽籌委會的同學盡心盡力籌辦是次展覽，並祝第55屆聯校科學展覽順利舉行。

Prof Christopher CHAO

Vice President (Research and Innovation)
Chair Professor of Thermal and Environmental
Engineering
The Hong Kong Polytechnic University



Climate change and high carbon emissions are among the world's most pressing problems. Scientists around the world have been conducting different scientific research to advance knowledge in this area. It is time for scientists to leverage their multidisciplinary expertise and engage in path-breaking research projects geared towards achieving carbon neutrality. Interdisciplinary effort to transform carbon-related research to applications is of utmost importance.

The 55th Joint School Science Exhibition Preparation Committee has timely used 'Vitality' as the theme of the year. I believe that students' inventions focusing on increasing city efficiency, facilitating physical activities and revitalizing cultural heritages will be a promising start for them to explore sustainable development. From then on, students expectantly will be more thoughtful about various green initiatives and more engaged in minimizing carbon emissions, energy consumption and waste in their daily lives.

I believe that carbon neutrality has a core role in the values behind the theme of "Vitality". To support Hong Kong's goal of reaching carbon neutrality by 2050, researchers in Hong Kong are taking lead in the study of sustainable urban development, smart energy and waste management, just to name a few. There are many news clippings in recent years sharing how cutting-edge research can be turned into real-world solutions. For example, a research team from the Hong Kong Polytechnic University has spent a number of years formulating chiller optimization strategies to enhance the energy performance of air conditioning systems. Their solutions have found ways to reduce energy usage in a range of commercial and industrial buildings substantially. This helps deliver significant energy-saving benefits to society. I am sure that there will be more great examples coming out from the J.S.S.E. event this year.



Mr. Andre YUNG

Chairperson

The 55th Joint School Science Exhibition
Preparation Committee

Science brings different technological innovations to tackle problems in our daily lives. It is about time to revitalize our city and make use of science to bring us a better future. This year, we, the 55th Joint School Science Exhibition Preparation Committee (the J.S.S.E.P.C.) would like to arouse the public's curiosity about science and technology. Our project holders have to innovate unique and creative products that match the annual theme 'Vitality', hence gradually doing their utmost to revitalize our city through their exhibits.

The Joint School Science Exhibition (the Exhibition), our annual highlight, is organized to provide a platform for students and people who are zealous in science to approach this field. Through practising, learning and knowledge exchange, they get to know how integral science plays in our lives. Even though the scientific knowledge shared through this platform is just the tip of the iceberg, it is still worthwhile for all of you to explore and immerse yourself in this science occasion.

It is my greatest honour to be elected as the Chairperson of the 55th J.S.S.E.P.C. My incentive to join this family is the fabulous visiting experience I gained in the last year's Exhibition as a preparation committee member of the 54th J.S.S.E.P.C., the Project Holders' great passion for science and aspiration to contribute to society have radically amazed me, encouraging me to step up and play a crucial role in this year's Exhibition.

My heartfelt gratitude goes to the Executive Committees and Preparation Committee members. Even though we have confronted numerous hurdles together, we still accomplished our mission triumphantly. Besides, I am elated to have received support from our sponsors, supporting organizations, advisory board, adjudicating panel and other stakeholders who co-presented with us. Without a shadow of a doubt, it's difficult, if not impossible to organize the Exhibition successfully without your support. Last but not least, I would like to express my sincere thanks to Ms. Joey Yang, the Chairperson of the 54th J.S.S.E.P.C. and her conscientious supervision. It is my pleasure to meet all of you on the journey of organising the 55th J.S.S.E.

It is not plain sailing for the Preparation Committees to organise the Exhibition during the fifth wave of the pandemic. Yet, it's about time for all of us to relax and enjoy the eye-opening projects prepared by our Project Holders. I hope all of you can enjoy your time here and make your life vibrant again!

Ms. Avril CHENG

Vice-Chairperson

The 55th Joint School Science Exhibition
Preparation Committee



“Creativity is intelligence having fun” and that’s what I learned from Albert Einstein.

Throughout the entire time with the Project Holders, witnessing them turning their bold ideas into complex models, every bit of their creativity sparked my eyes astonishingly and brought me to a new perspective towards our theme, Vitality. Sometimes, I wonder how they could think of such ingenious ideas with just a few science theories. I guess, it must be their strong curiosity and passion towards science driving them so far from just an idea to a model that really helps our community.

Recalling my first visit to the J.S.S.E. last year, I was overwhelmed by the crowded gallery with diverse models from talented students all over Hong Kong. Hardly could I imagine after a year, I have become part of the Committee and organised the Exhibition bit by bit together.

During my terms of office as a Vice Chairperson, I would say it is like going on an adventure in the fog, especially during the pandemic, uncertainty exists everywhere. Fortunately, under the effort of all preparation committee members and executive committee members, the exhibition went smoothly as expected. Hereby, my wholehearted gratitude goes to their unstinting devotion and persistence.

Finally yet importantly, I earnestly hope that the 55th J.S.S.E.P.C. could continue its pursuit as a stepping stone to science education and exchange our ideas towards various issues in our society. I hope the exhibition could not just broaden our horizon in science, but also boost our creativity through knowledge.

INTRODUCTION OF THE J.S.S.E.P.C.

The annual Joint School Science Exhibition (hereinafter the J.S.S.E. or the Exhibition) is organised by the Joint School Science Exhibition Preparation Committee (hereinafter the J.S.S.E.P.C.), which is a registered (in accordance with the provisions of Section 5A of the Societies Ordinance) and charitable organisation in Hong Kong. It solely comprises students from more than 150 local secondary schools who are passionate about science. It aims at arousing the public interest in science, encouraging scientific research, promoting cooperation among secondary schools and fostering the exchange of scientific knowledge. For the past years, the Joint School Science Exhibition has been held successively and successfully, where participating schools have showcased their innovative inventions.

The concept of J.S.S.E. first came from a group of students from St. Paul's College whose purposes are to stimulate students' interest in science and add some positive spirit to Hong Kong by staging an exhibition that would appeal to the public. To implement this groundbreaking idea, the organization and execution were undertaken by the representatives of 10 founding schools with the assistance of Professor Payne, Dean of the Department of Chemistry of the University of Hong Kong in 1968. It was a pioneer of joint school events in Hong Kong, with 10 participating schools at first. On its 10th anniversary, the J.S.S.E.P.C. was officially registered as a non-profit making organization and the number of member schools exceeded twenty. Furthermore, Governor Sir Maclehoze was invited as the Guest of Honour at the opening ceremony of that year's exhibition. These achievements made the 10th J.S.S.E. one of the most memorable exhibitions in our history. In addition, since the 23rd J.S.S.E., delegates from overseas institutions and local universities have been invited to participate in the Exhibition so as to promote academic and cultural exchange between students from different nations.

With the unfailing support of sponsors, corporate partners, member schools, and supporting bodies in the education sector and the public, the J.S.S.E. continues to attract a great number of visitors every year with its achievements widely recognised in society. Stepped into its 55th anniversary, the J.S.S.E.P.C. will continue to adhere to the four major aims, to work together with each supporting unit and forge ahead.

一年一度的聯校科學展覽由聯校科學展覽籌備委員會舉辦。它是一個經政府註冊(根據香港社團條例第5A條註冊)的慈善組織,由來自全港多於一百五十間中學、並對科學有熱誠的學生所組成。聯校科學展覽旨在引起大眾對科學的興趣、鼓勵科學研究、提倡學校之間的合作和促進科學知識交流。在過去的五十四年以來,聯校科學展覽籌備委員會已經連續成功舉辦多屆聯校科學展覽,展出了無數具有創意的科學產品。

舉辦聯校科學展覽的想法來自於一群聖保羅書院的中學生,他們有志於透過展覽激發中學生對科學的興趣,以及為當時的社會氣氛增添活力。一九六八年,在香港大學化學系主任彭德勳教授的協助下,首屆聯校科學展覽由十所學校參與,成為香港聯校活動的先驅。直到第十屆,聯校科學展覽籌備委員會正式註冊成為非牟利團體,而會員學校亦躍升至二十餘間。當年更有幸邀請到時任港督麥理浩爵士為該屆展覽主持開幕儀式。自第二十三屆,聯校科學展覽籌委會每年都會邀請外地院校及本地大專院校的代表參展,以推動不同國家的學術及文化交流。

有賴贊助商、各合作單位、會員學校教育界和大眾的鼎力支持,聯校科學展覽每年都吸引了大量參觀者,而其成就亦得到廣泛認同。踏入第五十五個年頭,聯校科學展覽籌備委員會將繼續堅守四大宗旨,與各單位攜手合作,向前邁進。

THEME OF THE YEAR

Vitality 活力

Science in Creativity, Synergy between Vitality
探索科學無限可能，攜手追尋活力創新

In this hectic-paced city, not only do citizens have to face various pressures, but also have to endure various inconvenience in their daily lives. Highly repetitive daily procedures procrastinating our city pace have grown weary for citizens and lost their vitality. Physical exercise has become the only effective solution to relieve stress. Regular exercise helps manage our physical health and mood, thus regaining our vitality. That being said, acid rain and air pollutants produced by burning fossil fuels have eroded many of our cultural heritage and historical sites. All of these have become rising concerns due to the rapid development of urbanisation.

Hence, the 55th Joint School Science Exhibition Preparation Committee has decided to use "Vitality" as the theme of the year, hoping that science is utilized to restore vitality to our city, human's lifestyle and our cultural heritage. Students are expected to probe into three aspects to design their innovative inventions: increasing city efficiency, facilitating physical activities and revitalizing cultural heritages. We believe that these inspiring ideas can help the public to improve the quality of life and enhance sustainable development.

在步伐急促的都市，都市人不僅要面對各方面的壓力，更要忍受生活中的諸多不便，繁瑣且一成不變的日常工序拖慢了城市原本急促的節奏，令人們感到厭煩，失去活力。運動成為了人們排解壓力的良方，規律的運動不但能強身健體，而且有助舒展身心，減輕精神壓力，使人們重展活力。話雖如此，人類燃燒化石燃料所產生的酸雨和污染物正在逐漸侵蝕文物和古蹟，世界各地的人類文明遺產逐漸變樣。在城市及現代化的影響下，以上種種問題亦變得日趨嚴重。

有鑑於此，第五十五屆聯校科學展覽籌備委員會將以「活力」作為年度主題，希望大眾能通過科學來增添日常生活的活力，並以提升城市效率、促進運動效能以及保護文物古蹟作為切入點，設計創新的發明，進而提高市民的生活質素以及社區可持續發展的可能性。

ADJUDICATING PANEL

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Dr. BU Siqi
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Dr. Joshua HO
Dr. Stephanie MA
Dr. Min WANG
Dr. YUEN, M. Y.
Dr. YU, David Hoi Fung

The Chinese University of Hong Kong

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Professor CHAN Michael Kenneth
Professor Bo ZHENG

The Hong Kong University of Science and Technology

Professor Andrew Tsz Chung MAK

Hong Kong Baptist University

Dr. Patrick Ying Kit YUE
Dr. Anna Oi Wah LEUNG
Dr. Sam LAU

City University of Hong Kong

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Dr. LAM, Y. W.
Dr. YUEN Shiu Yin, Kelvin
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MEMBER SCHOOLS

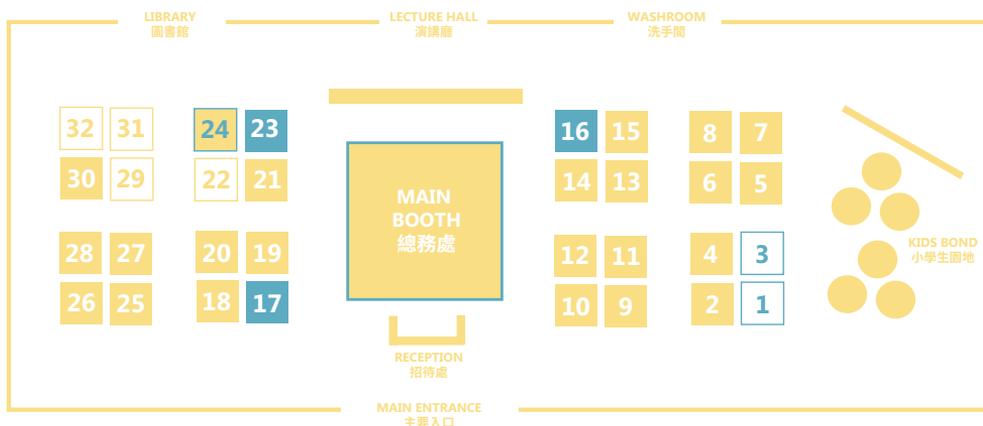
ABERDEEN BAPTIST LUI MING CHOI COLLEGE
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BAPTIST LUI MING CHOI SECONDARY SCHOOL
BELLIOS PUBLIC SCHOOL
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CUHKFAA CHAN CHUN HA SECONDARY SCHOOL
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迦密主恩中學
迦密聖道中學
迦密柏雨中學
中華基督教會全完中學
中華基督教會協和書院
中華基督教會銘基書院
中華基督教會蒙民偉書院
陳瑞祺(喇沙)書院
中華基金中學
張振興伉儷書院
宣道會鄭榮之中學
金文泰中學
廠商會中學
中華傳道會安柱中學
中華傳道會劉永生中學
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拔萃女書院
天主教母佑會蕭明中學
基督教香港信義會信義中學
播道書院
福建中學
福建中學(小西灣)
德望學校
優才(楊殷有娣)書院
協恩中學
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香港道教聯合會鄧顯紀念中學
香港道教聯合會圓玄學院第三中學
港大同學會書院
可風中學(舊色園主辦)
可立中學(舊色園主辦)
旅港開平商會中學
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寶血會上智英文書院
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漢華中學
香港三育中學
港鄧鏡波書院
何東中學
南亞路德會沐恩中學
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NING PO NO.2 COLLEGE
NOTRE DAME COLLEGE
OUR LADY OF THE ROSARY COLLEGE
PENTECOSTAL LAM HON KWONG SCHOOL
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SING YIN SECONDARY SCHOOL
SMKMCF MA KO PAN MEMORIAL COLLEGE
SOUTH TUEN MUN GOVERNMENT SECONDARY SCHOOL
ST. BONAVENTURE COLLEGE AND HIGH SCHOOL
ST. CATHARINE'S SCHOOL FOR GIRLS, KWUN TONG
ST. FRANCIS' CANOSSIAN COLLEGE
ST. FRANCIS XAVIER'S COLLEGE
ST. FRANCIS XAVIER'S SCHOOL, TSUEN WAN
ST. JOAN OF ARC SECONDARY SCHOOL
ST. JOSEPH'S ANGLO-CHINESE SCHOOL
ST. JOSEPH'S COLLEGE
ST. LOUIS SCHOOL
ST. MARK'S SCHOOL
ST. MARY'S CANOSSIAN COLLEGE
ST. PAUL'S CO-EDUCATIONAL COLLEGE
ST. PAUL'S COLLEGE
ST. PAUL'S CONVENT SCHOOL
ST. PAUL'S SCHOOL (LAM TIN)
ST. PAUL'S SECONDARY SCHOOL
ST. ROSE OF LIMA'S COLLEGE
ST. STEPHEN'S COLLEGE
ST. STEPHEN'S GIRLS' COLLEGE
ST. TERESA SECONDARY SCHOOL
STEWARDS POOI KEI COLLEGE
TACK CHING GIRLS' SECONDARY SCHOOL
TAI PO SAM YUK SECONDARY SCHOOL
TOI SHAN ASSOCIATION COLLEGE
THE Y.W.C.A. HIOE TJO YOENG COLLEGE
TRUE LIGHT GIRLS' COLLEGE
TRUE LIGHT MIDDLE SCHOOL OF HONG KONG
TSANG PIK SHAN SECONDARY SCHOOL
TSUEN WAN PUBLIC HO CHUEN YIU MEMORIAL COLLEGE
TSUNG TSIN COLLEGE
TUNG CHUNG CATHOLIC SECONDARY SCHOOL
TWGHS LO KON TING MEMORIAL COLLEGE
TWGHS SUN HOI DIRECTORS' COLLEGE
TWGHS WONG FUT NAM COLLEGE
WA YING COLLEGE
WAH YAN COLLEGE, HONG KONG
WAH YAN COLLEGE, KOWLOON
WEST ISLAND SCHOOL
YCH LAW CHAN CHOR SI COLLEGE
YCH LAN CHI PAT MEMORIAL SECONDARY SCHOOL
YEW CHUNG INTERNATIONAL SCHOOL
YING WA GIRLS' SCHOOL
YLPMSAA TANG SIU TONG SECONDARY SCHOOL
YUEN LONG PUBLIC SECONDARY SCHOOL

瑪利諾修院學校(中學部)
瑪利曼中學
循道中學
民生書院
新界鄉議局大埔區中學
寧波公學
寧波第二中學
聖母院書院
聖母玫瑰書院
五旬節林漢光中學
保良局何蔭棠中學
保良局百周年李兆忠紀念中學
保良局董玉娣中學
保良局姚連生中學
香港培道中學
保祿六世書院
香港培正中學
培僑書院
皇仁書院
高主教書院
聖公會莫壽增會督中學
聖公會林裘謀中學
聖公會李炳中學
聖公會曾肇添中學
嘉諾撒聖心書院
慈幼英文學校
沙田學院
沙田官立中學
沙田崇真中學
順德聯誼總會翁祐中學
聖言中學
馬錦明慈善基金馬可賓紀念中學
南屯門官立中學
聖文德書院
聖傑靈女子中學
嘉諾撒聖方濟各書院
聖芳濟書院
荃灣聖芳濟中學
聖貞德中學
聖若瑟英文中學
聖若瑟書院
聖類斯中學
聖馬可中學
嘉諾撒聖瑪利書院
聖保羅男女中學
聖保羅書院
聖保祿學校
藍田聖保祿中學
聖保祿中學
聖羅撒書院
聖士提反書院
聖士提反女子中學
德蘭中學
香港神託會培基書院
德貞女子中學
大埔三育中學
台山商會中學
基督教女青年會丘佐榮中學
真光女書院
香港真光中學
曾壁山中學
荃灣公立何傳耀紀念中學
崇真書院
東涌天主教學校
東華三院盧幹庭紀念中學
東華三院辛亥年總理中學
東華三院黃笏南中學
華英中學
香港華仁書院
九龍華仁書院
西島中學
仁濟醫院羅陳楚思中學
仁濟醫院靚次伯紀念中學
耀中國際學校
英華女學校
元朗公立中學校友會鄧兆棠中學
元朗公立中學

FLOOR PLAN



- | | | |
|-----------|--|---------------------|
| 1 | ST01 Science Theatre | 科學劇場 |
| 3 | ST02 Science Theatre | 科學劇場 |
| 16 | SB02 Photo-taking Booth | 拍照攤位 |
| 17 | SB03 Souvenir Booth | 紀念品售賣處 |
| 23 | SB04 Game Booth | 攤位遊戲 |
| 24 | EB01 Innovation and Technology Commission | 創新科技署 |
| 22 | UD03 The Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong | 香港中文大學－系統工程及工程管理學系 |
| 29 | UD02 The University of Hong Kong 2022 IGEM Team | 香港大學－2022 IGEM Team |
| 31 | UD01 The Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong | 香港中文大學－機械與自動化工程學系 |
| 32 | EB02 Hong Kong Red Cross John F. Kennedy Centre | 香港紅十字會甘迺迪中心 |

2	PH03 Tsuen Wan Public Ho Chuen Yiu Memorial College	荃灣公立何傳耀紀念中學
4	PH12 Kiangsu-Chekiang College (Shatin)	沙田蘇浙公學
5	PH25 Sha Tin Methodist College	沙田循道衛理中學
6	PH21 Sha Tin Government Secondary School	沙田官立中學
7	PH01 CCC Kei Yuen College	中華基督教會基元中學
8	PH09 TWGHS Sun Hoi Director's College	東華三院辛亥年總理中學
9	PH19 Belilios Public School	庇理羅士女子中學
10	PH08 St. Joseph's College	聖若瑟書院
11	PH26 Carmel Pak U Secondary School	迦密柏雨中學
12	PH05 SKH Bishop Mok Sau Tseng Secondary School	聖公會莫壽增會督中學
13	PH23 Queen's College	皇仁書院
14	PH18 Bishop Hall Jubilee School	何明華會督銀禧中學
15	PH17 Christian Alliance College	宣道中學
18	PH24 St. Paul's College	聖保羅書院
19	PH07 Hong Kong Baptist University Affiliated School Wong Kam Fai Secondary and Primary School (Secondary Section)	香港浸會大學附屬學校王錦輝中 小學 (中學部)
20	PH13 St. Mark's School	聖馬可中學
21	PH15 Munsang College	民生書院
25	PH27 Homantin Government Secondary School	何文田官立中學
26	PH16 Hong Kong Chinese Women's Club College	香港中國婦女會中學
27	PH10 Man Kwan Pak Kau College	萬鈞伯裘書院
28	PH22 Aberdeen Technical School	香港仔工業學校
30	PH11 Salesian English School	慈幼英文學校

VOTING METHOD

You can now take part in deciding the **Most Popular Booth** as well as the **Best Presenter** by voting for the one that you appreciate the most! Your vote is no doubt a token of gratitude for the hard work of all our Project Holders.

公眾現可投票選出**最受歡迎隊伍及最佳介紹員**，以表達對不同隊伍和參賽者的支持和鼓勵!

Voting Procedure

1. Write down your English full name (as shown in identity document) on the voting sheet.
2. Mark down the number (/ name) of your favourite booth and presenter.
3. Hand in the voting sheet to the Main Booth.

*Please be noted that you need to show the required document of identification when voting to prevent situations of repeated voting and thus ensure the fairness of the vote.

Thank you for your participation!

投票程序

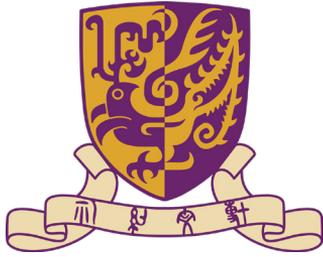
1. 在選票上寫上英文全名(需與身分證明文件所顯示的資料一致)。
2. 在選票上填妥心儀的參賽隊伍和介紹員的所屬編號(或姓名)。
3. 把選票交回總務處。

*請注意遞交選票時需出示身分證明文件來防止重複投票的情況和確保其公正性。

感謝你的熱心參與!

INTRODUCTION OF PROJECTS

展品介紹



**THE DEPARTMENT OF
MECHANICAL AND
AUTOMATION
ENGINEERING, THE
CHINESE UNIVERSITY
OF HONG KONG**

Category: Applied Science

Person in charge:
Professor SONG Xu
Professor CHEN Yue
Teacher advisor:
Professor SONG Xu
Professor CHEN Yue

Our Exhibit will have two themes, namely "Robotics" and "Green Building", showcasing student work of Mechanical and Automation Engineering and Energy and Environmental Engineering programmes.

For the "Robotics" part, the robots designed and built by students for the Robocon Contest will be displayed. The CUHK Robocon team was crowned Champion in the Robocon 2019 Hong Kong Contest and the ABU Asia-Pacific Robot Contest 2019 in Mongolia (for the first time as Hong Kong Team). In 2020, the team achieved the 1st Runner-up in Hong Kong Contest and won the Special Award by Panasonic System Solutions Japan Co. Ltd. in the ABU Asia-Pacific Robot Contest 2020 in Fiji. In 2021, the team was crowned Champion in Hong Kong Contest.

With these achievements, visitors will have a chance to take a look at our winning robots in our Exhibit. These robots were designed and built based on different competition themes. For instance, the theme of the Robocon 2019 Hong Kong Contest was "Great Urtuu" (inspired by a traditional Mongolian messenger system) and the theme in 2021 was "Throwing Arrows in the Pot" (inspired by ancient archery in China).

For the "Green Building" part, a student project regarding the influence of window behavior on indoor PM2.5 pollution will be displayed. PM2.5 is one of the indoor air pollutants and affects indoor air quality. As particulate matters within a structure come primarily from indoor human activities and drift in from the outside environment, it is unclear if individuals should open the window for natural ventilation.

In our Exhibit, visitors will learn about how window affects the indoor concentration of PM2.5 in both autumn and spring seasons, and the current green building standards in Hong Kong.

Engineering for a Smarter Future

機械與自動化工程學系以「機械人學」和「綠色建築」為展覽主題，展出機械與自動化工程學及能源與環境工程學的學生作品。

在「機械人學」的部分，公眾人士可認識同學於「全港大專生機械人大賽」中所研發的、設計創新精密的機械人。中大機械人隊曾於2019及2021年「全港大專生機械人大賽」奪得冠軍，2019年更在蒙古舉行的「亞太廣播聯盟機械人大賽」奪冠，是該比賽創辦至今首支在亞太區賽贏得冠軍的香港隊伍。因應每年不同的比賽主題，例如2019年的「飛奔大漠中」（靈感來自蒙古的傳統傳訊方式）和2021年的「全埋投入」（靈感來自中國古時的投壺），團隊設計出各具特色的機械人。公眾人士可於本展覽攤位認識兩款得獎機械人。

在「綠色建築」的部分，展出的是一項學生畢業專題研究「窗戶的狀況對室內微細懸浮粒子(PM2.5)污染的影響」。PM2.5是室內空氣污染物之一，影響室內空氣質素。建築物內的懸浮粒子主要來自室內人類活動和外面環境。因此，此項研究探討人們是否應該開窗通風。公眾人士亦可從中了解到在春季和秋季，窗戶如何影響室內PM2.5的濃度，以及香港綠色建築的標準。

Expression and production of Cecropin B, isoform Q53 (Q53 CecB) in the microalgal chassis *Picochlorum* sp. (BPE23)



THE UNIVERSITY OF HONG KONG 2022 IGEN TEAM

Category: Biology

Person in charge:
Kenneth Ng Tsz Chun
Teacher advisor:
Kenneth Ng Tsz Chun

The indiscriminate use of antibiotics has led to the rise in antibiotic resistance. An efficient and capable solution to prevent the spread of these superbugs are Antimicrobial peptides (AMPs). AMPs not only have broad-spectrum antimicrobial activities, including that against bacteria, viruses and parasites, but also do not cause resistance given their low specificity. Microalgae are an ideal chassis to optimise the production of AMPs given their low susceptibility to AMPs and the ability to sustain themselves through phototropic means.

Our project focuses on the expression and production of the AMP Cecropin B, isoform Q53 (Q53 CecB), in the microalgal chassis *Picochlorum* sp. (BPE23). This AMP is chosen for its well-known broad-spectrum antimicrobial properties and high efficacy. *Picochlorum* sp. is very productive and tolerant to environmental conditions, making it a versatile chassis for protein expression. As the project progresses, we aim to adapt our protein expression system to other AMPs, such as Sphistin, and chassis, such as *Chlorella autotrophica* and *Picochlorum renovo*. We will also explore future plasmid expression in chloroplast, and secretion of AMPs into the environment.

To test our transgenic strains, we will be performing *in vitro* assays and also testing its viability in a simulated aquasystem. We will quantify the production AMPs to determine if they can meet a certain Minimum Inhibitory Concentration (MIC), to prove its effectiveness against potential pathogens. We will simultaneously evaluate the growth conditions of the microalgae to ensure that AMP production does not hinder productivity significantly.

In terms of application, we aim to test our chassis in a simulated aquasystem. Commercially grown fisheries are prone to outbreaks of diseases, and thus are treated with antibiotics. However, treatment with antibiotics would ultimately lead to the rise of antibiotic resistance. In this scenario, an efficient and capable solution is to replace antibiotics with antimicrobial peptides (AMPs).

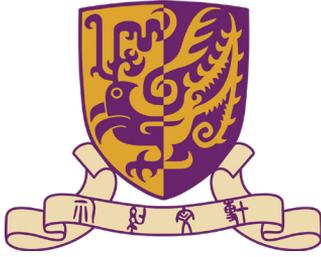
Upon successful expression of AMPs via our chassis, it will be able to replace antibiotics whilst still providing protection to organisms against pathogens, allowing us to tackle the problem of antibiotic resistance and disease outbreaks.

抗生素耐藥性(antibiotic resistance)是指細菌由於人類對抗生素的濫用,逐漸演變出能對抗生素產生抵抗力的能力。這些耐藥性細菌因能抵禦多類常用的抗生素而被稱作「超級細菌」。超級細菌的衍生是當今全球公共衛生,以至世界經濟的一大威脅。雖然現時仍可使用其他非常規抗生素來治療,但其效能可能較弱或會引起較多副作用。耐藥性細菌產生的速度也比研發新的藥物快,耐藥性問題若不獲改善,有效的治療方案會愈趨減少。

抗菌肽(Antimicrobial Peptides)是其中一個有效防止超級細菌傳播的解決方案。抗菌肽不僅具有廣譜抗菌活性,能有效對抗細菌、病毒和寄生蟲,而且由於其特異性低,所以不會引起耐藥性。

我們的研究將會透過基因改造,使用微藻 *Picochlorum* sp. (BPE23)生產Cecropin B,一種提取自飛蛾的抗菌肽(CecB)。由於抗菌肽對微藻沒有殺傷力,且微藻能夠通過光合作用自生自長,因此十分適合用以大量生產抗菌肽。除此之外, *Picochlorum* sp. 的生產力高,而且能在極端環境下生存,是一個理想的模式生物。我們會於模擬水系統中測試我們的系統,評估微藻的生長條件,以確保抗菌肽的生產不會對微藻的健康造成顯著影響。我們希望能進一步把專題項目擴闊至其他抗菌肽(如sphistin)及生物模型(如微藻 *Chlorella autotrophica*及 *Picochlorum renovo*)。我們亦會探索在葉綠體中製造抗菌肽,以及在細胞體外分泌抗菌肽的可行性。

商業漁業的養殖場經常有大型疾病爆發的風險,會為漁民造成不少損失。為了治療魚類疾病,漁民常過分使用抗生素來為魚進行治療。然而,這也直接引致基因突變的超級細菌不斷繁衍,產生抗藥性。因此,我們期望這專題項目能夠被應用於漁業發展之餘,亦希望這項研究能有效說明抗菌肽取代抗生素的可能性,是有效地舒緩抗生素耐藥性和疾病爆發問題的關鍵之一。



**THE DEPARTMENT OF
SYSTEMS ENGINEERING
AND ENGINEERING
MANAGEMENT, THE
CHINESE UNIVERSITY
OF HONG KONG**

Category: Artificial Intelligence,
Healthcare

Person in charge:
Professor Helen MENG,
Professor Hong CHENG
Teacher advisor:
Professor Helen MENG,
Professor Hong CHENG

**A System for Lifestyle Analysis and
Early Detection of Dementia Risk from
Actigraphy Data**

In this hectic-paced city, citizens have to face busy schedules and immense pressures. Highly repetitive daily procedures procrastinating our city pace have grown weary for citizens and lost their vitality. To promote a healthy lifestyle, we will provide a demo of our system for life style analysis and early detection of dementia risk from actigraphy data

With the availability of wearable devices, it is easy to capture people's physical activity. Our team has designed a novel deep learning model which is trained from movement data of healthy subjects and subjects with Alzheimer's Disease. It uses a time-aware attention mechanism to model the effect of circadian rhythms. Our model takes the movement data of a subject as input, and generates meaningful analysis and visualization of his/her daily behavior patterns (e.g., sleeping, exercising, light activity, etc.), and provides a graphical indication of potential dementia risk.

Our model provides an automatic, low-cost solution for continuously monitoring the change of physical activity of people in their daily living environment. We believe our system hits "vitality", the exhibition theme of the year, very well. It can raise the awareness of a healthy lifestyle and help people regain vitality through regular exercises.

Life Without Boundaries and Fly High with Sports 生活無界限，運動展高飛



HONG KONG RED CROSS JOHN F. KENNEDY CENTRE 香港紅十字會甘迺迪中心

Hong Kong Red Cross John F. Kennedy Centre is a special school serving and providing therapeutic, nursing, and boarding services to disabled students since it was founded in 1967.

For students with more complicated and severe medical conditions such as spastic quadriplegia or non-ambulatory stage of muscular dystrophy, tasks such as sitting upright, putting the head in mid-line, actively controlling the limbs for functions are difficult for them. Their participation in daily lives including mobility, self-care activities, learning and leisure is hindered and they are largely dependent on their caretakers.

According to the United Nations Convention on the Rights of Persons with Disabilities (2006), society should empower the disabled community to have the rights to lead their independent lives based on their free and informed consent as active members of the society. To achieve such a goal, affordable and high-quality mobility aids are the essential factors. Taking into account the cognitive and physical ability as well as the basic needs of the students after assessment, Occupational Therapists of our school have converted an ordinary electric wheelchair into a "chin-controlled" one by mounting the joystick control at a position that fits the client at a low cost. The modified wheelchair serves as a training wheelchair to allow the student to learn the driving skills and allows room for adjustment according to the student's physical needs before the client actually considers spending a large amount of money to buy a self-owned electric wheelchair for use in daily life. Besides learning the basic control of the joystick to maneuver the wheelchair and to maintain a good posture while driving, they also need to master advanced skills such as backing, going through doors, negotiating obstacles, etc. and learn about driving safety and etiquette.

Through this training process, students gain awareness of their own abilities and limitations, which encourages them to work closely with their therapists in improving knowledge and skills in driving and their physical control, as well as to modify the wheelchair configurations and its functionalities. As they become more skillful in operating the wheelchair and are able to navigate freely, their social circles are expanded. Their learning ability, sense of accomplishment and level of independence are also enhanced.

Our school encourages our students to establish and achieve positive life goals by actively exploring possibilities. Through these 2 sports-science projects, "Chin-controlled Wheelchair" and "Boccia Pipes", cater for the special needs of the students, we hope to help the disabled overcome their physical obstacles, and encourage students with athletic potentials to foster interests in lifelong sports and develop their strengths.

Thank you to the 55th Joint School Science Exhibition Committee for offering us the opportunity to participate in this year's exhibition. Our students will benefit from this valuable exposure and further enhance their self-confidence, and be the vivid examples in "Life Without Boundaries and Fly High with Sports". We are confident that in the near future, our special-able students will develop a true passion in lifelong sports and fully demonstrate their strengths.

本校有部分學生是嚴重病患(例如:肌肉營養不良症或嚴重四肢痙攣型腦癱)會引致兒童的身體和四肢殘障。他們不能走路,就算使用輪椅代步亦極為艱難,只有等待別人協助,生活變得被動。

根據2006年聯合國「身心障礙者權利公約」,社會應讓殘疾人士盡可能獨立地享有個人行動能力,而價廉和優質的行動輔助器具卻是不可或缺。本校職業治療師因應學生之需要,用低廉的成本把普通電動輪椅改裝為「下巴控制電動輪椅」,讓一些還有頭部活動能力的學生駕駛電動輪椅。學生除了須要學習以下巴活動令控制桿指向不同方向,亦要掌握輪椅的方向和速度,並要注意四周環境。過程中,學生能更加了解自己的能力和限制,與治療師密切溝通以調節輪椅的配備和功能。當練習得純熟後,他們就能自主地去四處探索,對學習和社交帶來莫大幫助。

本校鼓勵學生作多方面嘗試,建立正面積極的人生目標。並因應學生的特殊需要而設計「下巴電腦輪椅」及「硬地滾球+管道」,希望幫助殘疾人士能減少障礙,亦提升有潛質的學生能找到對終身運動的興趣及發揮所長。

本人很高興我校的學生有機會參與第五十五屆聯校科學展覽,除了學生能擴寬眼界及提升自信外,亦能以「生活無界限,運動展高飛」,展現「活力」的一面。在將來,希望有特殊需要的學生能找到終身運動的興趣及發揮所長。



CCC KEI YUEN COLLEGE

中華基督教會基元中學

Chan Chi Yan 陳智恩
Cheng Tin Yuet 鄭天悅
Ng Hui Kiu 吳煦喬
Wong Nga Ki 王雅琪

Due to the vast population but limited land resources in Hong Kong, many restaurants and stores are located on the upper floors and apartments. Therefore, it is difficult for wheelchair users to travel around Hong Kong. For this reason, we have created the Vitality Chaser. It opens the door, creating multiple possibilities for wheelchair users.

Electric wheelchairs and stair lifts have been around for some time, but they both have a fatal flaw, which is limited by the narrow passageways that are unsuitable for places like tenement buildings. In view of this, we took advantage of the caterpillar track. It can disperse the weight of the wheelchair and increase the friction so that it is possible to descend along the stairs.

In order to make up for the shortcomings of this type of product, we have made changes to the rear wheel. The wheel consists of a star-like bracket and tyre. The bracket is in a shape that can be fixed onto the stairs when climbing up. The tyre changes with the shape of stairs so that the caterpillar track can attach to the staircase, allowing a smooth climbing on stairs.

Vitality Chaser 推動生活

香港甚少無障礙設施，更因為地少人多，不少食肆和商店均為樓上舖。這些情況令居住在樓道狹窄的唐樓的長者以及輪椅使用者感到難堪且不便。基於上述問題，我們創作出這款展品——推動生活。

或許不少人認為可上落樓梯的輪椅和上落樓梯機已經面世許久亦不足為奇，但我們在研究同類型產品時發現它們有一個致命的缺陷。因被樓梯深度所限，所以它們不適用於唐樓這些地方狹窄的地方，但偏偏卻有不少需要使用輪椅的長者居住在這些地方。有鑑於此，我們保留其履帶設計加以改良。履帶可以分散輪椅的重量，亦可增加對地面的摩擦力同抓地力，令輪椅可以安全爬梯，讓使用者更為安心。

為了彌補該類型產品的缺陷，我們在後輪作出了改動，令輪椅不受樓道深度限制。首先可以利用後輪令輪椅向下走幾步，使背部的履帶可依附着樓梯。後輪是由六角星形的支架和氣呔組成。上樓梯時，支架和支架之間的空隙能卡在樓梯級，為輪椅作支撐。後輪的氣呔會隨著樓梯形狀改變，包裹著樓梯，使後輪可以穩固向下走，令履帶可依附着樓梯上，藉以幫助輪椅使用者上落樓梯。

MakeUCool

As the problem of global warming has been continuously exacerbating in recent years, blistering-hot temperature is a major push factor that stops people from going out, hence affecting the vitality of the people in our city.

Our product aims to lower the perceived temperature of the human body from the environment, thus reducing the push factor mentioned above. Therefore, people are encouraged to engage in outdoor activities, and hence increasing vitality.

However, products available on the market holding the same hope are not efficient enough to make a change. Products like mobile air conditioners can indeed blow wind to cool us down, but only the neck region is cooled, which is not effective when the temperature further increases. Such trivial contact surfaces are not sufficient.

On the other hand, one of the components in our product is a network of tubes that covers your back. This results in a much larger contact surface. Plus, ethylene glycol, which readily absorbs heat, is adopted as the flowing fluid inside the tube. Both features allow heat to be carried away from your body efficiently.

In order to build a circular system, a water pump and a radiator are mounted. Noteworthy, it is detachable for the sake of convenience, or for doing laundry.

While increasing people's vitality, we also hope our product can decrease the usage of air conditioners, tackling the problem from its root by slowing down global warming and reducing electric consumption.

隨著全球暖化越趨嚴重，炎熱的氣溫令市民外出的欲望大大降低。

我們希望能透過降低體感溫度，從而提升市民外出的欲望，藉此提升他們的活力。

市面上有類似目標的產品，大多都難以幫助降溫。譬如便携式冷氣機，透過向頸部吹出冷風，達至降溫的效果。但是產品接觸的範圍太小，難以發揮作用。

我們的產品主要由一系統的塑膠管和乙二醇組成，透過均速流動的乙二醇，帶走身體的熱力。此外，產品也配備了水泵和散熱器。

產品的管道系統佈滿了整個背部，而如此大的接觸範圍能令降溫效果更為明顯。乙二醇吸熱散熱能力高的特點亦有助產品發揮功效。另外，整個系統可以裝在衣服裏，避免了造型突兀，吸引別人目光的憂慮。

我們希望這產品能讓市民保持活力，同時減低使用冷氣時排放的溫室氣體，為保護地球出一分力。



TSUEN WAN PUBLIC HO CHUEN YIU MEMORIAL COLLEGE 荃灣公立何傳耀紀念中學

Yung Pok Yu 翁博瑜
Leung Tsz Wang 梁子宏
Lau Kwok Pun 劉國本
Tong Chi Kit 唐智傑



**SKH BISHOP MOK
SAU TSENG
SECONDARY SCHOOL
聖公會莫壽增會督中學**

Au Yat Long 區日朗
Lam Yau Chang 林佑澄
Lam Sze Ka 林思嘉
So Wai Kan 蘇蔚芹

The Pure Cyclor

純·淨·循環

Due to the highly repetitive daily procedures, Hong Kong citizens become spiritless and doing physical activities has been the only solution to regain their vitality. For instance, cycling has become a hit and a multitude of cycling lovers see pedaling as one of their means of transportation. Nevertheless, roadside air pollution becomes a disincentive to road cycling. With this issue in mind, we therefore designed "The Pure Cyclor" which acts as an environmentally friendly air purifier. It aims at reducing the chance of inhaling air pollutants and offering a more comfortable environment with improved air quality while cycling through the city.

In Pure Cyclor, electricity is generated from the movement of the wheel during cycling. The kinetic energy is converted to electrical energy by bottle generators, which will then be used for the functioning of the fan and the UV light. Moreover, The Pure Cyclor consists of 3 layers of filters. The pre-filter filters out large substances, while the HEPA filter traps tiny particles. The photocatalytic filter is in charge of decomposing the toxic substances without releasing noxious compounds through photocatalysis. Furthermore, an electric fan is installed at the top to ensure that the purified air is drawn out of the device and goes towards the cyclist's face along the air pressure gradient.

With the aid of The Pure Cyclor, it is believed that the problem of roadside pollution can be alleviated and more citizens will use bicycles for transportation, hence bringing vitality to our city.

香港人每天都籠罩在苦悶及壓抑的氣氛下，而運動正是重拾活力的唯一方法。例如單車就是一項能夠短途代步的運動。然而，香港路邊空氣污染越來越嚴峻，暴露在混濁的空氣中無疑大大減少市民踏單車的意欲。有見及此，我們特意設計了「純·淨·循環」裝置，旨在為單車手提供潔淨的空氣，減低他們因路邊空氣污染患呼吸道疾病的風險，以此推廣單車這項運動。

我們的裝置分為三個部分：抽氣、發電和空氣淨化裝置。我們利用單車發電機把輪胎旋轉的動能轉換成電力以供電子紫外光燈及電風扇。電風扇會將外部空氣抽入裝置內淨化，再朝使用者吹送。另外，將會有三種過濾網負責淨化空氣，分別是前置濾網、高效率空氣微粒子過濾網（HEPA濾網）和光觸媒濾網。前置濾網首先過濾空氣中較大的粒子，例如塵埃和頭髮；HEPA濾網會進一步過濾空氣中的微細粒子；而光觸媒濾網會在紫外光燈的催化下把空氣中的有毒分子分解為無害的物質。

靠着「純·淨·循環」，我們相信可以減輕空氣污染對單車手的影響，使單車手能夠享受更舒適的道路單車環境，並因而鼓勵更多人加入單車代步的行列，讓城市再次充滿活力。

QueQat 排隊的狸生



HONG KONG BAPTIST UNIVERSITY AFFILIATED SCHOOL WONG KAM FAI SECONDARY AND PRIMARY SCHOOL (SECONDARY SECTION) 香港浸會大學附屬學校王 錦輝中小學 (中學部)

Chu Hok Yin 朱學研
Ng Ying Yau Michelle 吳映滙
Leung Tsz Ching 梁芷晴
Wong Chun Ho 黃俊豪

Supermarkets in Hong Kong often have long queues during rush hours, especially during the pandemic as people rush to stock up on daily necessities. Such waiting is inefficient and drags the city's pace. In light of this situation, QueQat is designed to reduce the total waiting time of customers in the supermarket, hence increasing the efficiency of the shopping process.

QueQat is an AI trained using Deep-Q Learning, an algorithm that belongs to machine learning. In the training process, QueQat utilizes data to simulate different queue allocations repeatedly and evaluates its action using a Q-value until the queuing strategy is optimized. In other words, QueQat "learns" by itself on how to place customers in different queues such that the total waiting time is minimized. This optimum queuing strategy is more efficient than the present situation where all customers lining up in one queue or customers deliberately choosing the shortest queue.

QueQat's ease of use is one of its advantages. Upon arriving at the supermarket checkout queues, customers only have to scan a QR code and input relevant information. He or she will then be directed to the optimal queue calculated by QueQat. The use of artificial intelligence means that QueQat can adapt to a wide range of scenarios, ensuring its promising results even across different supermarkets.

QueQat also has the potential to be applied to other general queuing scenarios, including but not limited to food delivery, bank counter services, and vaccine allocation.

超市每日人客如鯽，尤其在繁忙時間，客人更是排着長長的人龍，將店舖出口擠得水泄不通。近幾年，新冠疫情的蔓延使市民湧到超市搶購貨物，漫長的等候和購買時間都大大拖慢原有生活節奏，令城市運行效率驟減。QueQat即由此而生，期望能利用深度學習，減省顧客的總等候時間。

QueQat模擬着店舖情況，反覆練習如何疏導人流，按照客人的服務時間將其分流到不同收銀櫃檯等候，並根據賞罰制度調節Q-value，盡量降低等候時間。換言之，QueQat能夠自己學習，而它採納的策略亦勝過現有的排隊方法，例如：所有人集中於同一隊或讓顧客自行選擇最短隊伍。

使用QueQat非常方便——客人只需掃描二維條碼並輸入簡單資料，就可以隨QueQat的指引到某一隊伍靜候。人工智能令QueQat能夠靈活應變，就算在不同超市、不同情況亦可以派上用場。

QueQat還具備其他潛在應用價值，有望用於許多牽涉排隊的日常活動，例如：外賣服務、銀行櫃台服務及疫苗分配。



ST. JOSEPH'S COLLEGE

聖若瑟書院

Chiu Ho Kiu 趙浩喬
Lau Sing Yin 劉星然
Yeung sin yin 楊善然
Wong Anthony Ho Ting 王浩庭

NAntiVio

NAntiVio is a UV blocker made up of metal oxide nanoparticles, namely zinc oxide and silica (silicon oxide). It blocks light in a physical way by absorbing and reflecting both UV radiation and visible light. Nanoparticles of zinc oxide and silica not only retain their highly effective UV light-absorbing capacity, but also absorb and scatter visible light, rendering them transparent on the walls and surfaces of heritages and artworks. The nano size of the particles (1-100nm) is to increase the surface area to volume ratio, hence increasing the effectiveness and efficiency of absorbing UV radiation. Inorganic materials based on metal oxide semiconductors can efficiently absorb UV radiation and exhibit good heat-resistance properties. The absorption range of the zinc oxide nanoparticle differs from silica nanoparticles. Zinc oxide can best absorb UV light ranging from a wavelength of 355 nm to 380 nm, while silica is best at absorbing UV light with a wavelength of ~200 nm. They can be used as transparent inorganic matrices or embedded in polymers as UV absorbers. By modifying the substrate nanoparticles with a solution of 3-aminopropyltriethoxysilane, the adhesive forces between a surface and the nanoparticles can be strengthened, which could ensure the nanoparticles adhere to the model's surface. Apart from its ability to absorb ultraviolet light, it is also waterproof and antibacterial against many compounds present in the atmosphere such as sulphur compounds.

NAntiVio 是一種由金屬氧化物納米顆粒做成的紫外線阻滯劑，主要有氧化鋅和二氧化矽兩種。氧化鋅和二氧化矽納米顆粒不僅保留了其高效的紫外光吸收能力，而且能吸收和散射可見光，使它們在文物和藝術品的表面及牆壁上顯得透明。顆粒的納米尺寸（一至一百納米）能夠有效提高其表面積/體積比，進而提升其吸收紫外線輻射的有效性和效率。NAntiVio 是由一種能有效吸收紫外光的金屬氧化物半導體所做成的無機材料，更能展示良好的耐熱性能。氧化鋅納米顆粒吸收紫外光的範圍不同於二氧化矽納米顆粒。氧化鋅能吸收波長三百五十五納米至三百八十納米的紫外光，而二氧化矽能吸收波長約二百納米的紫外光。它們能用作透明無機基質或作為紫外線吸收劑嵌入聚合物中。透過加入 3-氨基丙基三乙氧基矽烷溶液至 NAntiVio，微粒子和表面之間的黏力能被增強，防止微粒子脫落。除了能吸收紫外線以外，NAntiVio 還具有防水和防菌作用，讓塗漆對外界的有害物質有更好的抗性。

The Vital-ocipede



TWGHS SUN HOI DIRECTORS' COLLEGE

東華三院辛亥年總理中學

Chung Lik Wang 鍾力宏
Zhang Chun Wai 張俊煒
Cheng Siu Tung 鄭兆彤
Jim Ho Yan 詹皓仁

As a rudimentary knowledge, physical inactivity is a major risk factor for various chronic diseases. However, the engrossing situation in Hong Kong, especially during the pandemic, has drastically prohibited citizens from exercising regularly. It is of great importance for us to improve our physical well-being and regain vitality through exercising.

To correspond with the theme Vitality, we have devised an invention dedicated to incentivizing users to engage in habitual exercise routines. The appliance mechanism consists of three distinct components, namely a bicycle with a treadmill motor attached, a fermentation chamber and a freezer system attached to the fermentation chamber. The freezer compartment is driven by the power generated from the pedaling action of the bicycle, in which it can receive carbon dioxide produced from the yeast via alcoholic anaerobic respiration in the fermentation chamber. As the internal temperature of the system in the freezer drops, carbon dioxide will readily dissolve in the water bottle to create a carbonated fizzy drink. Such a drink creates a materialized motivation for the user and encourages them to complete the whole one-hour bicycle session.

Through our design, we wish to offer a substantial "liquefied" inducement to encourage citizens to exercise regularly. In our case, pedaling can increase people's physical activity level which is vital to their physiological and mental well-being.

眾所周知，缺乏運動是各種慢性疾病的主要成因。然而，現時香港有很多人缺乏運動，尤其是新冠病毒疫情期間，市民失去平日運動的習慣。因此，我們希望透過鼓勵運動，讓市民重拾活力，保持身體健康。為呼應是次科展主題「活力」，我們設計了一個專門用來鼓勵用戶培養運動習慣的發明。此設計由三個組件組成——與跑步機和發動機組合而成的單車、發酵容器以及接駁著發酵容器的製冷系統。製冷系統利用騎駛自行車所產生之電力，並透過收集發酵容器中的酵母，利用酒精發酵產生二氧化碳。由於製冷器內部溫度下降，因此所收集的二氧化碳將更易溶於水，從而制作出可自行調整口味的碳酸飲料。飲料能為用戶提供一個物質上的動力，以鼓勵他們完成一個完整的一小時踏單車環節。

縱觀整個設計，我們希望能提供一個大量「液化」的誘因鼓勵市民踏單車，讓他們恆常運動，促進心理和精神健康。



MAN KWAN PAK KAU COLLEGE 萬鈞伯裘書院

Chu Tin Yik 朱天翼
Huang Xincheng 黃鑫城
Wong Tin Yui 王天睿
Lo King Hin 羅敬軒

Under the COVID-19 pandemic, people around the world have put more attention to the disinfection of public transportation. However, the hygiene of transportation does not live up to the expectations of many citizens. There are a lot of viruses in many public facilities, in the station, in the carriages, etc. Many people choose to clean their seats using the disinfectant spray. Thus, we designed an automatic public transportation cleaning system that can maintain the hygiene condition of public transport. In this design, we innovatively designed the automatic public transport seat cleaning system with the combination of the following two automation items: a seat unit with silver ion cleaner and a UVC ultraviolet disinfection lamp car cleaning system. We hope that human activities can return to normal and the city regains its vitality as soon as possible.

Automatic public transportation cleaning system 自動公共交通座位清潔系統

新冠肺炎疫情肆虐下，全球人們變得更加重視公共交通消毒清潔，但交通工具的衛生狀況卻令市民非常擔憂。在公共交通工具上，人流非常多，無論站內設施或是車廂都暗藏許多細菌，很多人亦會選擇用消毒除菌噴霧去清潔自己的座位。因此，我們設計了一個自動公共交通清潔系統，以保持交通工具的衛生情況，令市民放心地乘搭。在這設計中，我們創新地結合以下兩項自動化項目：座位銀離子的清潔劑座位裝置及UVC紫外線消毒燈車廂清潔系統。我們旨在讓市民及早回歸正常生活，讓城市重拾活力。

BM-X 電·單車



SALESIAN ENGLISH SCHOOL 慈幼英文學校

Luo Jia Xian 羅嘉賢
Au Tsz Him 歐子謙
Jaius Yip 葉政熹
Yu Tin Yau 余天佑

According to WHO (World Health Organization), a person should have at least 75 minutes of intense aerobic exercise per week to improve their cardiorespiratory, muscle and bone health. However, all of us know how 'ideal' this suggestion is when we look at our heavy workload or hectic study schedule in a busy city like Hong Kong.

To rectify this problem, our team came up with a device called 'BM-X'. It is attached to an office chair. It consists of a pair of paddles which help mimic how we ride on a bicycle, a motor to generate renewable energy to charge your phone, and a counter which records your activity level and power generated throughout the day. By riding on our device, people can do aerobic exercise wherever they are. It will become much easier for us to work out, burn calories, build up muscles, and strengthen our cardiovascular system. Moreover, our motivation to exercise and keep fit will no longer be detoured by bad weather conditions. Statistics can also help us set up our goals more easily which encourages us to exercise more.

Therefore, with the advent of 'BM-X', we hope to combine exercise with other daily activities. We hope to see students riding 'BM-X' during lessons and adults riding it during meetings or even lunchtime. Exercise should never be so hard, we sincerely hope to make a difference.

根據世界衛生組織(WHO)的建議,每人每週應進行至少75分鐘高強度有氧運動,以加強其心肺功能、骨骼強壯和肌肉健康。然而,在香港等繁忙都市,大部份市民都忙於工作或學業,導致難以達成世衛之建議。

所以,為解決此問題,我們研發出產品「BM-X」,將一個腳踏式發電機連接在辦公椅上,讓使用者能夠藉著腳踏模擬踩單車時的狀況,從而帶動發電機產生電能。即使在辦公室裏,亦能做運動。透過應用程式介面,視像化其運動進程和能源製造情況,讓使用者一目了然。

透過「BM-X」,無論在任何天氣狀況下,市民都能夠隨時隨地做運動,有利於他們鍛鍊身體、燃燒卡路里、增加肌肉量及加強其心血管系統。透過紀錄使用者的運動數據,讓使用者更容易定立目標,讓他們更有動力去做運動。

因此,我們希望透過BM-X將運動結合於日常生活當中。期望日後亦能在學校、辦公室等地方,看到學生和上班族使用我們的產品。在做運動的同時,亦能產生可再生能源,藉此打破常規,讓做運動從此變得簡單。



KIANGSU-CHEKIANG COLLEGE (SHATIN)

沙田蘇浙公學

Wong Chi Ping 王治平
Chan Ho Long 陳浩朗
Lam Pui Yin 林沛賢
Wong Yuet Ching 黃乙晴

Under the raging pandemic, especially during the fifth wave, online lectures and working from home were demanded progressively. Citizens couldn't exercise as most sports facilities were closed, which had largely lowered citizens' health levels.

To maintain the citizens' health, our team created a web application (a software) which encourages end-users to exercise by picking their area of body pain. The software will display a video, showing stretches of certain areas to help relieve the pain. For example, Eye exercises that can reduce eye strain are suggested by default.

End-users will gain experiences after their daily exercises and level up after accumulations. Their pets will grow after leveling up. This system is in the hope of raising users' interests in more frequent usage of the software, ideally every day.

To ensure the accuracy of the executed poses, an optional AI-powered motion tracking system can be enabled, which identifies and analyses the user's body via a camera, and issues hints for the user to align their moves with the intended exercises.

Most of the major Operating Systems are supported, (including but not limited to Android iOS, Microsoft Windows, macOS, Linux and otherwise, subject to possible limitations from dependencies). By broadening the software's usage, end-users can exercise conveniently via various devices. Through this project, we hope end-users can then live more healthily under the pandemic.

Invigorating stretching 舒筋活樂

在疫情的肆虐下，尤其是第五波疫情的衝擊，令線上教學和在家工作的需求日益增加。各大運動場所也須關閉，使人們足不出戶，減少了運動量，令健康水平隨之下降。

為了保持市民的健康水平，我們的團隊設計了一個網頁應用程式（下稱程式）以鼓勵使用者以拉筋方式舒緩其身體疼痛的部位。在選擇有關的身體部位後，程式將播放運動影片，以減輕他們的疼痛感。例如，程式會推薦一些眼部運動以舒緩眼部疲勞。

當使用者完成每日運動後會獲得經驗值，經過一定累積便會升級，程式裏的寵物亦會因此成長，藉此激勵使用者更頻繁地使用我們的程式。

為確保使用者在執行正確的運動姿勢，使用者可啟用人工智能運動跟蹤系統。該系統會通過攝像頭識別，分析使用者身體的主要部位，並發出描述性提示，告訴他們需調整動作，與預期的動作保持一致。

為了擴大使用範圍，程式兼容於大多數主流操作系統，包括但不限於安卓、視窗、iOS、macOS和Linux等，附以不帶程式特別功能之可能性。因此，使用者可通過多種方法登錄並隨時隨地做運動。通過這個項目，我們希望使用者可以在疫情下變得更健康。



Vitapet 唯寵

ST. MARK'S SCHOOL

聖馬可中學

Lee Hoi Cheuk 李愷卓
Chan Hiu Yu 陳曉宇
Lo Tin Yiu 羅天遙
Wu Hing Jason 吳興

As the representative from St. Mark's School, we proudly present you with our debut game—Vitapet. As the name suggests, our app combines both pets and the idea of vitality. Our game is about keeping a virtual pet. If you have ever wanted to keep a pet, feed a pet, or love a pet, but have been limited by real-life circumstances, this game is for you.

In the city of bustle and hustle, the prospects of keeping a pet are becoming more and more distant. It may be that your apartment building bans pets or the responsibilities and obligations that come with keeping a pet worries you. Our app Vitapet aims to solve this problem: the pet you keep is virtual -- meaning any real-life concerns will now be void. Instead, through doing physical exercise, you earn in-game currency, which can be used to purchase food and accessories for your pet. If you are a pet lover, our app will provide you with a great incentive to exercise.

Let's talk about the game itself, shall we?

We have made rules that encourage regular, routine workouts. For example, exercising daily earns you exercising streaks that boost your pet experience. With experience points, your pet can grow like a real pet! We believe that regular exercise can keep you away from chronic diseases and improve mental health.

We also believe in the benefits of a balanced diet, and we implemented that in our game in the form of pet food: the player has to vary the menu, and of course feed their pets regularly, to keep them healthy. If the player feeds too much of the same food, the pet will get sick, again just like a real pet.

Workouts are great, but only when they are done the right way. There is a time limit for every session, ensuring that players will not overwork. The currency-time curve is not linear but logistic, favoring sessions of optimum length, which trains endurance and cardiovascular function. Players are advised to work on aerobic exercises first, then move on to anaerobic, which is more intense.

In the future, we anticipate that technology will be advanced enough for us to integrate holograms into our app. Once this technology is readily available, Vitapet will be visible in real space and the pet will run alongside the player, blurring the lines between reality and the virtual world, thus enhancing the users' experience. It sticks with our aim to promote vitality while keeping the pet strictly virtual and hassle-free.

大家好!我們是來自聖馬可中學的隊伍。我們的展品是4位同學齊心協力開發出來的應用程式--Vitapet唯寵。雖然遊戲還未完全開發完成,但是基本的遊戲元素和功能已經齊備,只要你享受跟動物互動、喂食、建立羈絆,你就會對我們的遊戲產生興趣!

我們的設計理念是想透過各種遊戲機制的配合來鼓勵玩家們運動,在與唯寵交互同時保持每日應有的運動量。希望我們的作品能為身處都市、難以抽出時間做運動的各位提供了休閒和保健的動力!

為配合本年度主題「活力」,我們設計的遊戲中亦加入了鼓勵玩家恆常做運動的機制。只要各位玩家日常地做運動,便可以取得遊戲中的貨幣,為你的虛擬寵物購買糧食和裝飾,可謂真正正地虛擬養寵物。

遊戲中為鼓勵均衡的飲食,我們更為不同的寵物糧食加入了健康值等數值,而遊戲中的虛擬寵物亦會因健康值的高低而改變它們生病的機率,為遊戲添加一層真實感。

而在不遠的未來,我們希望可以混合全息投影的技術,令虛擬寵物能夠在你做運動的時候陪伴在你的身邊,務求做到和真實的寵物無異,從而鼓勵眾多市民追求真正的活力。



MUNSANG COLLEGE

民生書院

Ng Yuk Kin Justin 伍郁堅
Su Man Lok Adrian 蘇文諾
Fu Ming Hon Harvey 傅明翰
Huang Yuzhou 黃禹周

Due to the pandemic and lockdowns, the exercise capacity of most citizens has been greatly affected. As a result, it has become easier than ever for citizens to experience muscle fatigue mid-exercise. However, signs of fatigue are often ignored by people, endangering their physical health. Hence, our team has designed a massage strap which is able to detect and inform the users of signs of muscle fatigue.

The first part of this strap is the detection of muscle fatigue. By utilizing infrared bulbs and photodiodes, our strap could monitor the blood oxygen level of the user. Under normal circumstances, the human blood oxygen level is between 96% and 98%. However, when our strap detects the user's blood oxygen level to be under 95%, it implies the user is most likely suffering from muscle fatigue, and the strap will thus inform the user to rest and activate the second part of the strap, massaging.

Muscle fatigue is primarily caused by the accumulation of lactic acid. Therefore, our team designed an integrated therapy system composing an ultrasonic system and an air compression system that help to speed up the expulsion of lactic acid in human muscles. By emitting ultrasonic energy to the muscles, the strap is able to heat up deep tissues and blood veins in larger muscles such as the quadriceps, triggering vasodilation which can increase the rate of metabolism to dispose of lactic acid. Meanwhile, air compression can increase blood pressure and blood flow, assisting the disposal of lactic acid.

Thigh Detect-&-Relieve Strap (T.D.R.S.) 足跡·足適

這兩年的疫情讓很多人留在家中的時間增加。當人們在失去了定時鍛鍊身體這個習慣後又要嘗試重新鍛鍊時，過度疲累便會發生，但似乎很少人能察覺到自己的身體於異常下發出的警告，令自己經常在極為嚴重的情況下才去求醫，使身體較難恢復。有見及此，我們研發了一個可以自動偵測以及舒緩疲勞的產品，希望可以藉此改善這個問題。

我們的產品能在人疲勞的時候發出警告。經過我們的發現，一個人處於疲勞狀態時，血氧含量會下降(由 96%-98%降到 95%以下)。為此，我們自製了一個可以測量血氧含量的儀器，當測量到血氧含量處於較低的狀況時，儀器將會傳送訊息到使用者所佩戴在手腕的裝置上，同時亦會激活儀器，使用超聲波*(ultrasound)以及空氣壓縮(air compression)進行舒緩。肌肉疲勞主要是由乳酸堆積而造成的，只要將血液中堆積的乳酸排走，又或者加快乳酸被排走的速度，便能得到舒緩疲勞的效果，而超聲波和空氣壓縮正能達到所需效果。超聲波可以加熱皮膚，令血管內血液的流速加快，從而增加新陳代謝的速度，從而達到快速排出乳酸的目的；與此同時，空氣壓縮可以增加血壓，加速血液循環的速度，達致排出乳酸的效果。

Portable Air Quality Checker 空氣污染雷達



HONG KONG CHINESE WOMEN'S CLUB COLLEGE 香港中國婦女會中學

Fu Yin Ming 符賢明
Hsu Sung Hei 許崇熙
Wong Yat Hin 黃逸軒
Lo Yu Shing 勞譽誠

Nowadays, many people are living under high stress, especially during the pandemic. One of the ways to relieve stress is by doing exercise. Regular exercise improves our health and mood, which increases our vitality. However, when participating in physical activities, poor air quality may be a nuisance.

Poor air quality poses serious risks to public health. When people exercise in polluted air, they inhale more air pollutants, such as sulphur dioxide (SO₂) and nitrogen dioxide (NO₂), which may trigger heart and respiratory diseases. The School of Public Health of the University of Hong Kong estimated that in 2021, the adverse health impact brought by air pollution had led to 1,691,209 doctor visits, 98,451 hospital bed days, and 1,329 premature deaths. Therefore, we aim to provide a solution for people to discover cleaner spaces to enjoy physical activities healthily.

Our invention, the Portable Air Quality Checker, consists of a portable sensor and a mobile application. When it is being held by the user, the sensor measures the concentrations of common air pollutants in the surroundings. Then, the data collected is transferred to the mobile application through Bluetooth, and it will be used to calculate the Air Quality Health Index nearby.

If users have existing heart or respiratory diseases, they may check our application for the suggested locations for doing sports. Thus, users can improve their health while avoiding air polluted areas, and the purpose of regaining "vitality" can be achieved.

香港都市生活繁忙，我們希望夠透過運動去放鬆及提升個人活力，但空氣污染卻會降低人們做運動的意欲。不論是進行室內或室外運動，戴口罩並不能完全阻止空氣中的污染物入侵我們的呼吸系統。在2021年，空氣污染一共造成1329宗過早死亡案例及各種不良健康影響，如呼吸困難、喉嚨痕癢、氣喘、咳嗽、胸痛或胸悶等等。因此，我們應重視日益嚴重的空氣污染問題，避免情況加劇，以確保公眾健康。

透過深入了解現有的空氣監測站，我們察覺到現存系統存在不少問題。因此，我們進行了一系列的實驗及研究，並研發了一套新的空氣監測系統，希望能夠填補現有系統的漏洞。

通過融合各種污染物感應器的特性，我們製造出一套由多項感應器組成的空氣監測系統。我們期望利用環保署研發的空氣質素健康指數算法去配合新研發的計算系統做到實時監測，紀錄各種嚴重空氣污染物，例如二氧化硫 (SO₂) 及二氧化氮 (NO₂) 的濃度，這些空氣污染物有機會引發心臟及呼吸系統疾病。我們希望新研發的檢測系統能讓市民了解即時的空氣質素，從而避免他們長時間暴露在含有污染物的地方。用戶亦可以從我們設計的手機應用程式中跟從由裝置提供的建議，到空氣質素較佳的地方舒展身體、放鬆心情。我們的研發目的是降低市民接觸空氣污染物的機會，從而讓市民能在沒有空氣污染的困擾下重現活力，在運動中展現笑容。



CHRISTIAN ALLIANCE COLLEGE 宣道中學

Wu Hoi Kit 胡凱傑
Wong Lok Tung 黃諾彤
Chow Man Ho 周文灝
Choi Wong Shing 蔡煌晟

The lack of freshwater resources has been a fundamental problem that cannot be ignored in densely populated cities. Recycling and using renewable freshwater in households can effectively support the sustainable development of our city. Our product is a vacuum distillation water purifier. While the ordinary water distillation machine can only distil water and kill bacteria at 85°C, our machine can turn water into water vapour at 47 to 48°C. It can also remove bacteria and separate pollutants at the same time. Compared to an ordinary distillation machine, ours can save 3.1MJ to 3.19MJ of energy per litre of clear water produced.

Under normal pressure (standard atmospheric pressure is 101325 Pa), the boiling point of water will be lower. Thus, water will boil directly at normal temperature in a vacuum environment. The vacuum distillation function can not only reduce the heat energy required for distillation but also speed up the process. To make our device, a heat-resistant rubber hose, an acrylic rubber sheet, a water level switch sensor, etc. are the basic materials needed. The total cost of purchasing these materials does not exceed \$1200. Therefore, everyone can easily make their own vacuum water distillation machine while its price is affordable for all families.

Vacuum Distillation Water Purifier 真空蒸餾淨水

在現今社會，淡水資源供應因乏是在人口稠密的城市不容忽視的問題。在家居層面，使用可再生淡水對城市可持續發展有重要的幫助。我們的產品是真空蒸餾淨水機，名稱的由來是機械內含有真空和蒸餾功能，因此真空蒸餾淨水機能令使用者直接知道其功能。普通蒸餾水機需要達到85度才能把水完全蒸餾並殺死細菌，而我們這台淨水機的好處是只需47度至48度便能將水有效變成水汽移動至另一容器，並把細菌和污染物分離，而目標是節約3.1MJ至3.19MJ的能量。

除此以外，水在低於正常氣壓（標準大氣壓力為101325Pa）時沸點會降低。在真空常溫的情況下，水會直接沸騰，因此真空蒸餾水機能降低蒸餾水所需的熱能（48度至49度），並加快蒸餾出純淨水，從而達到節約時間、成本和循環水資源之成效。淨水機所需的材料包括耐熱膠管、壓克力膠板及水位開關感應器等等。材料總成本不超過\$1200，便宜的價格不會令經濟不佳的家庭難以負擔，他們亦能享用蒸餾過後的純淨食水，實屬每個家庭的必備之選。

ENANTIOMER – Underwater Greenhouse Sports 水下種植



BISHOP HALL JUBILEE SCHOOL

何明華會督銀禧中學

Suen Simeon Wan To 孫允陶
Tang Ka Lun Ronald 鄧嘉倫
Siaw Zi You Jasmine 蕭梓濠
Ng Cheuk Ting Matthew 吳卓庭

When the unprecedented COVID-19 pandemic struck Hong Kong, the food supply was suspended, the food price skyrocketed and people started to panic. While the government and the general public might just treat it as another short-term crisis that warrants limited attention, our team has discovered a worrying and urgent problem – Hong Kong is too reliant on imported food.

In order to reduce Hong Kong's reliance on imported food, we have come up with a revolutionary project – the Underwater Greenhouse named "ENANTIOMER". Inspired by the present technology of underwater farming, the model revolves around one central theme – bridging humans and nature by integrating the technology of hydroponics and aquaponics. Regrettably, the development of hydroponics in Hong Kong has been impeded due to the large-scale conversion of agricultural land to residential and commercial purposes. Therefore, we propose constructing an underwater greenhouse which can free up spaces for other land uses, while minimising devastating impacts caused by unfavorable weather conditions in Hong Kong, such as typhoons, extreme temperature and heavy rain.

With an underwater greenhouse, not only are the crops less vulnerable to high temperatures but they are also surrounded by a sphere which creates a suitable environment for farming. The sphere is composed of two materials. The upper hard shell is made of acrylic which allows sunlight to penetrate while the lower part is made of semi-permeable materials that make reverse osmosis possible. As the materials are permeable to water molecules only, the sphere can obtain fresh water for the plants from sea water nearby. To prevent the greenhouse from floating, weight is also attached to the bottom of ENANTIOMER.

With the model constructed, we strive to make good use of lands below water to tackle the shortage of agricultural lands in Hong Kong. Plus, the project enhances food production efficiency by farming in a relatively moderate underwater environment all year since water has a higher specific heat capacity than soil and granite on land. Thus, it can turn Hong Kong into a more self-sustainable, smarter, and more vital city.

Together, we will create a better tomorrow for Hong Kong.

當前所未有的新冠肺炎疫情影响香港時，香港食品供應暫停，蔬菜價格飆升，人們亦開始恐慌。由此，我們發現了一個非常令人擔憂和緊迫的問題——香港過於依賴進口食品。

為了減少香港對進口食品的依賴，我們提出了一個革命性的專案——名為“ENANTIOMER”的水下溫室。受當前水下耕作技術的啟發，該模型圍繞著一個中心主題——透過整合水培和魚菜共生來搭建人類與大自然的橋樑。遺憾的是，由於農業用地大規模轉用於住宅和商業用途，香港水培的發展受到極大阻礙。因此，我們建議打造一個水下溫室，為其他土地騰出空間，同時儘量減少颱風、極端溫度和暴雨等惡劣天氣因素造成的破壞性影響。

有了水下溫室，農作物既不再容易受到高溫的影響，而且還被一個球體所包圍，為耕作創造了一個合適的環境。該球體由兩種材料組成，上部硬殼由丙烯酸製成，允許陽光穿透，而下部由半滲透材料製成，容許反滲透。由於這些材料只能滲透水分子，球體可以從附近的海水中為植物獲得淡水。為了防止溫室漂浮，ENANTIOMER的底部也附加了一定重量。

透過我們構建的模型，能夠充分利用水下土地，解決香港農業用地短缺的問題。此外，該專案能透過全年在相對溫和的水下環境中耕作，以提高糧食生產效率，因為水比土地上的土壤和花崗岩具有更高的比熱容，從而使香港成為一個更可持續、更智慧和更有活力的城市。

願我們能為香港創造一個更好的明天。



BELILIOS PUBLIC SCHOOL

庇理羅士女子中學

Wong Hei Lam 黃晞琳
Wong Ka Yin Serena 汪加賢
She Annie 余安妮
Chan Nga Wai 陳雅慧

The design idea came when we visited old urban areas in Hong Kong. These areas were relatively duller than the newly developed ones. The old and weathered concrete buildings lose freshness in the community after years of development.

Our product is named Spark'n'Clay. Its main component is epoxy and hardener. When mixed, the hardener allows the resin to go through the process of curing. The epoxy groups in the resin connect with the chemical units of the hardener (also a catalyst) speeding up the reaction, and the bonding between the two reactants is enhanced. A stable, clear, and strong sheet of plastic is formed after the process. This one-layer surface can cure existing concave walls and help old walls restore their surface appearance. Due to its colloidal properties, it is smooth on the surface and exhibits waterproof properties.

The use of epoxy resin is mainly because it is cheaper and simple to use compared with other similar products on the market. Yet, it also has characteristic defects. Epoxy resin gradually turns yellow due to UV exposure and time. In view of this, we added pigment to the product to block the colour change of the resin. Adding colour to the wall is also adding vitality at the same time. This epoxy resin also has limitations, it will take more time to completely dry the paste at room temperature than under warmth.

Spark'n'Clay

我們本次實驗作品為 Spark'n'Clay。有見於社區古舊建築物外層有損傷、破裂的情況，外牆會因為漏水而脫落令其失去色彩，令建築物變得不美觀，致使社區整體活力減少。本產品為一層可固化原有凹面牆壁，幫助舊有牆壁修復其表層外觀的表面塗層。其膠質特性能使牆壁表面光滑，展示出防水之用。

在進行資料搜尋後，我們發現環氧樹脂會在紫外線的照射下及隨著時間推移變黃。後來我們找到一種添加劑：光穩定劑。它可以防止色變，但價格昂貴，亦較難訂購。這個方案最終被否定了。最後，我們找到了最簡單方便的辦法，也就是添加顏料。它既能掩蓋環氧樹脂的色變，還價格便宜，更能配合我們產品其中一個目標——通過給牆壁添加顏色，重展社區活力。

而使用環氧樹脂，其因主要為相比市面上其他類似功能的產品便宜以及簡單，但相對而言，他們也有特質性上的缺陷。環氧樹脂由於紫外線照射和時間推移而漸漸變黃，有見及此，我們在產品中加上顏料，即可遮擋樹脂的色變，也可以給牆壁添加色彩，同時增添活力。此環氧樹脂亦有其他限制，於室溫時，等待其乾透的時間會比在高溫的環境下久。

Muscle Get & Multifunction Sitting Sports



SHA TIN GOVERNMENT SECONDARY SCHOOL 沙田官立中學

Li Lok Yin 李洛言
Leung Hei Man 梁希聞
Lam Kwan Ho 林均昊
Yang Tsz Yau 楊梓筱

Hello, we are a group of Secondary 3 students from Shatin Government Secondary School. We are very honoured to participate in the finals of the 55th Joint School Science Exhibition. The purpose of our project is to help urbanites to exercise during their busy work, promote physical and mental health, restore vitality and improve their quality of life.

The first thing is an app that encourages people to take the initiative to exercise - Muscle Get. This app can increase people's desire for sports, adding vitality and colour to the city. By recording their size, weight, and muscle mass and comparing them, people can realize that the rewards of exercise are not limited to mental but can also provide a good change in all aspects of their bodies. It gives them an accurate picture of their physical condition.

Another product is Multifunction Sitting Sports. This is a chair that is converted from an office chair. It has the function of exercising, allowing people to do some easy and simple exercises after work. Moreover, during the epidemic, many people are working from home. They cannot go out to exercise. This chair can provide a way to "satisfy exercise addiction" for those who want to exercise but don't have time.

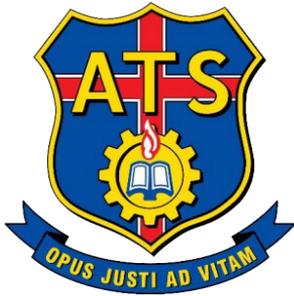
We hope that urbanites can take a good rest and exercise while working hard so that they can relieve stress during exercise, reduce negative emotions such as depression caused by a hectic lifestyle and improve the metabolic and secretion functions of their bodies.

大家好，我們是來自沙田官立中學的中三學生。我們非常榮幸能參加第五十五屆聯校科學展覽的決賽，我們參賽的目的是為了讓都市人能在繁忙的工作裏也可以騰出時間做運動、促進身心健康，使人重獲活力，從而提高生活質素。

首先要介紹的是一款能夠鼓勵人們主動做運動的軟件—Muscle Get。這個軟件能夠增加人們對運動的渴望，為城市增添活力和色彩。軟件會通過記錄他們的體型、體重和肌肉量並進行比較。他們可以從中意識到做運動的回報不僅是精神上的，還可以提供身體各方面的良好變化，更可以準確地了解自己的身體狀況。

另一款產品是Multifunction Sitting Sports。這是一把由辦公椅改裝而成的產品。它具有運動的功能，讓人們在工作之餘，可以做一些輕鬆簡單的運動。而且，疫情期間，很多人在家工作，並不能出去運動。因此這把椅子可以為那些想運動但沒有時間運動的人「一過運動癮」。

我們希望都市人能在繁忙的工作外也能做運動，在運動期間緩解壓力，減少日常生活引起的負面情緒，更能提高身體的新陳代謝功能，分泌多巴胺，讓人有滿足感。



ABERDEEN TECHNICAL SCHOOL

香港仔工業學校

Lee Kwok Shun 李國舜
Fok Wai Tung 霍偉棟
Pan Xiang Xi 潘相熹
Wu Alan 胡峰

At a Glance 一望就知

Have you ever stood outside a staff room for a long time just to submit an assignment or ask a question, or run from floor to floor just to find a busy teacher?

The purpose of At a Glance is to improve the working efficiency of students and school offices by eliminating the need to spend a lot of time waiting or searching for teachers on campus. For the school office, colleagues can better grasp the current status of teachers and avoid calling teachers who are on duty, which may interrupt their work, or going to the staff room and not being able to find them. For students, they no longer have to wait outside the staff room for a teacher and can make good use of their valuable time at school. For teachers, the short breaks are no longer a distraction and they could have more time to relax.

At a Glance uses LED lights to indicate the teachers' different working statuses (in or out of their seats). When a teacher sits on the cushion with the pressure sensor inside, the chip transmits a signal to the main board, which wirelessly transmits the signal to the LED board and changes the color of the teacher's position. The teacher seating chart with LEDs will be placed in an appropriate location on campus, such as outside the staff room or at the school office.

Of course, At a Glance can be used in different social environments to improve efficiency. It is particularly suitable for schools because not all students can immediately reach their teachers with just a phone call or message, as the teachers won't have much time to respond to numerous messages due to their heavy workload. Therefore, At a Glance is designed to increase efficiency without increasing the workload of either party.

你是否嘗試過在教員室外，花上大量時間等候，只為了跟老師交付一份作業或請教一條難題，

又抑或在各樓層間奔波尋找忙碌中的老師。你又是否有過這些困擾呢？

而我們發明「一望就知」的意義是希望學生以及校務處可以避免在學校中耗費大量時間去等候或尋找老師，從而提升工作效率。對於校務處而言，職員亦可以更好地掌握老師們的狀態，避免電話聯繫正在處理事務的老師，影響老師的工作，或特地去到教員室卻找不到老師而白走一趟。對於學生而言，他們不再需要在教員室外苦苦等候老師，可善用在學校寶貴的時間。對於老師而言，短暫的小息也不再為此受打擾而沒有時間放鬆休息。

我們「一望就知」的設計會以LED燈的開關，表示老師處於不同的工作狀態（在座位上或離開座位）。而我們會將壓力探測器放入老師座位上的坐墊裏，以傳輸信號到主機板，再由主機板將信號無線傳輸給LED燈板來改變顏色，從而顯示老師位置上的狀態。而設有LED燈的老師座位表將會放置於學校適當的位置，例如教員室外或校務處等。

當然，「一望就知」亦可以用於社會不同的環境之中，提升生活效率。它特別適合學校這特殊環境是因為未必所有學生能靠一個電話或訊息就能即時找到老師，同時老師工作繁重，沒有很多時間去回覆大量訊息。因此，「一望就知」能夠在不增加任何一方的工作量的情況下，提升效率。



Gymusical Player 健樂單車

QUEEN'S COLLEGE

皇仁書院

Cheung Pui Sum 張沛琛
Cheung Ka Ho 張嘉灝
Siu Chun Yu 蕭峻宇
Cho Chi Kong Carlton 曹志剛

'Gymusical Player' is an ideal product for city dwellers who prefer to do a workout at home. Gymusical is a portmanteau word which combines the words gymnasium and musical. We believe our model provides an ideal tool for home gyms which helps to boost cardiovascular health. We design 'Gymusical Player' in a way that people can exercise and enjoy music at the same time. Not only does this design encourage people to do more workouts to build endurance and strength, but it also helps them achieve a work-life balance to boost their vitality.

Gymusical Player is a multi-function indoor bicycle which possesses three major functions, including playing music, charging electrical devices and cooling down drinks.

1. Playing music

The electricity generated from exercises drives a motor that is installed in the music box. The motor then rotates the metal cylinder of the music box so that the protruding pins of the cylinder can pluck the individual prongs of a steel comb and produce notes. Different music boxes are installed to provide users with a wider range of variety. This is the most important function because music can relax the user's mind and relieve his/her stress, and also make exercising an entertaining and joyful activity.

2. Charging function

The electrical current produced, which is in AC, is changed into DC by a rectifier. The DC current then travels to a charger to charge a smartphone.

3. Cooling function

This function is non-electrical but essential and useful. A cup holder, which is installed in the upper part of the bicycle, can prevent heat gain by conduction and convection. This function helps maintain the temperature of the cold drink in the cup holder. This function is user-friendly as users will probably feel hot and thirsty after exercising and want to have some cold drinks.

我們產品的名稱是健樂單車，這名稱是健身和音樂的組合。我們相信此產品可讓都市人更多地在家中做運動，從而改善他們的心血管健康。用家可透過這產品，在做運動時，同時聽音樂。它不但鼓勵忙碌的都市人多做運動，以鍛鍊體能，而且可以協助他們在工作和生活之間取得平衡。

健樂單車擁有三大功能，包括了播放音樂，為電子器材充電，以及冷凍飲料。

播放音樂

發電機所製造的電能會推動音樂盒的摩打，然後摩打將會旋轉音樂盒的金屬圓柱體，撞擊金屬條，以播放音樂。用家也可以選擇安裝不同類型的音樂盒。這功能相當實用，因為音樂可以舒緩用家壓力，也能令他們享受運動的過程，找到運動的樂趣。

充電

發電機所製造的交流電會透過整流器，轉換為直流電。然後直流電在穩壓器降低電壓後會通過充電器為手機充電。

冷凍飲料

最後一個功能不需使用電能。單車上方將安裝一個能夠減少熱能吸收的保溫杯架，能夠保持飲料的溫度。這個功能將會令用家使用得更舒適，因為用家可在運動後立即可以享受飲料，可為用家降溫。總而言之，健樂單車擁有三個實用的功能。我們相信此產品能夠造福用家，在運動時得到享受。



FOUNDED 1851

ST. PAUL'S COLLEGE

聖保羅書院

Yeung Lok Wa Jr. Ray 楊洛驊
Hung Kwan Ngok 洪鈞岳
Nip Sin Hang Brian 聶善衡
Mak Chun To Oscar 麥俊陶

The purpose of this project is to create a shoe insole which utilizes the piezoelectric effect to generate electricity and evaluate its practicality in the market.

The piezoelectric effect is the ability of certain materials to generate an electric charge in response to applied mechanical stress and is commonly used in sensors and motors in real life. When external pressure is applied to a piezoelectric crystal, the crystal will undergo deformation and will then become polarized, creating a potential difference and generating electricity.

We took the concept of the piezoelectric effect and applied it to footwear. We connected several piezoelectric pads in series with a capacitor, which is used to store electricity, and integrated the circuit into a shoe insole, allowing it to be placed easily inside the shoe. Therefore, as the consumers' feet strike the ground, a force will be exerted on the piezoelectric pads in the shoes and the crystals will be compress, thus generating electricity. The electricity generated will then be stored inside the shoe insole, with the capacitor, and can then be used to charge other electronics.

Piezoelectricity allows electricity to be generated without using up any resources or releasing any harmful products, therefore the electricity generated can be considered to be clean. With global warming becoming more serious, the main goal of creating our product is to promote other versions of renewable energy sources and to reduce our carbon footprint. We hope that our product is able to generate enough electricity to offset the resources used to create the raw materials of our product. With the enhancements of piezoelectricity, unwavering quality and result power as of late, piezoelectricity and energy collecting are presently conceivable. We wish to advance the utilization of piezoelectricity among citizens in order to enhance the city's efficiency while also addressing the main theme of vitality.

Podelekt

該項目的目的是創造一種利用壓電效應發電的鞋墊，並評估其在市場上的實用性。

壓電效應是某些材料在外界對壓電晶體施加壓力時，該晶體會發生形變，然後變得極化，產生電位差並產生電力，通常用於現實生活中的傳感器和電機。

我們將壓電效應的概念應用到鞋類上，將幾個壓電片串聯在一個用於存儲電流的電容上，並將電路集成到鞋墊中。當使用者的腳觸地時，鞋裡的壓電片就會受到力的作用，壓縮從而產生的電能將通過電容儲存在鞋墊內，可用於為其他電子產品充電。

除設計鞋墊外，我們還通過對相關理論的提取、分析和理解等多個步驟，得到了壓電片增加的接觸面積與腳在地板上的表面積與產生電量為正相關關係的結論。實驗結果表明當使用一個電容連接到一個更大表面積的壓電片，增加電流和電壓是可能的。

壓電可以在不消耗任何資源的情況下產生電力，因此可被認為綠色能源。隨著全球暖化愈發嚴重，該產品的主要目標是推廣其他可再生能源，同時也減少碳足跡。我們希望這個產品能夠產生足夠的電力來抵消用於製造產品所用的資源。隨著壓電性能和結果功率的不斷提高，收集其能量已然可能。我們希望可以推動壓電的應用，以提高城市的效率，同時提高對活力這一主題的關注。

PictureLife



SHA TIN METHODIST COLLEGE

沙田循道衛理中學

Fung King Him 馮景謙
Fung King Yau 馮景悠
Wu Tsz Hong 胡子康
Chan Chun Yin 陳俊諺

These days, we live in a world in which people feel a lack of vitality. PictureLife is an app that aims to bring back vitality to people, through reminding them to take time off and take pictures. By encouraging people to use photography as an outlet, they can exercise self-expression regularly, relieving their stress and worries while documenting surrounding sceneries.

Studies have shown that photography is greatly beneficial to mental health, promoting one's mindfulness and productivity. Moreover, as a form of art creation, it can boost one's self-esteem and give a sense of accomplishment, facilitating mental calmness. Not to mention, with almost everyone having mobile phones with built-in cameras, getting into photography has become easier than ever. As such, we designed PictureLife with said benefits in mind.

Besides being a camera app, PictureLife has a notification system for reminding users to take photos routinely. It's up to the user to decide when and how they want to be notified, allowing great customizability. What's more, to make the app more satisfying to use, it includes artificial intelligence that analyses the photos taken and breaks down the elements inside the pictures, such as lighting, colour palette, and object positions. Using the collected data, PictureLife can give suitable suggestions to users for improving their photography skills, giving them a clear sense of progression while expanding their ways of expression. Furthermore, other features are implemented to improve the app's appeal, such as a photo gallery, a photo editor, and a photo generator. For more details, feel free to come and visit our booth!

PictureLife是一款透過拍照，為人們帶來活力的應用程式。這個應用程式能鼓勵他們拍攝身邊的景色，以表達自己的想法和感受，從而舒緩日常生活的壓力。

根據研究顯示，攝影有助提高心理健康水平，訓練觀察能力，從而促進工作效率。與此同時，攝影作為一門藝術，有助提升自信及成就感，培養正向思維，保持身心健康。現今，每人都擁有一部具備拍攝功能的手機，攝影變得入手簡單，亦更親民。因此，我們設計了PictureLife，讓使用者藉著攝影，活得更健康。

除拍攝功能外，PictureLife還具備通知設定，提醒使用者拍照。此功能亦可由使用者自行決定通知時間，讓程式變得個人化。PictureLife運用大數據，讓人工智能學習分析相片中的光暗、顏色、物件、位置等結構元素，以便分類相片。而且，在使用者拍照，PictureLife會從大數據中給予拍攝建議，引領使用者學習拍攝技巧，讓他們擴闊攝影眼界，及了解更多表達自己的方法。

PictureLife亦具備更多功能，增加程式的多樣性，如：圖片庫、編輯器、合成器等等。詳細內容可到我們的展位深入了解！



CARMEL PAK U SECONDARY SCHOOL

迦密柏雨中學

Lui Ying To 呂嶸韜
Leung Kwan Yi 梁筠怡
Lai Yik To 黎奕濤
Ho Cheuk 何卓

The food waste problem has been deteriorating over decades around the globe, especially in Hong Kong, where the situation is getting worse disturbingly. To combat this problem, we aim to use black soldier flies, which consume food waste at a fast speed, to ease the burden. In our study, a complete system has been developed to maintain an optimum living environment for black soldier flies, thus facilitating their food consumption rate. With the aid of the IoT system, the temperature and relative humidity was successfully controlled in the range of 25-35 and around 70% respectively. The food waste consumption was 130g at the beginning and it was doubled with our automatic adjustment prototype. Our system also provides a stage separation compartment for the development of black soldier flies. Besides consuming food waste, the black soldier fly has a high utilization value and ability to produce various products. Therefore, the black soldier fly represents a brand-new waste resource utilization method with low energy consumption and high output value. With the aid of black soldier flies, not only do we hope to solve the food waste problem in small communities, but also contribute to making the world a better place.

Food waste up-cycler 「升」級廚餘大師

在近幾十年來，全球的廚餘問題一直在惡化。尤其是在香港，食物浪費的情況越來越令人不安。為了解決這個問題，我們選擇了使用黑水虻，它是一種可以快速消耗廚餘的昆蟲，能幫助我們減輕廚餘問題的負擔。在這項研究中，我們開發了一個完整的系統來維持黑水虻的最佳生活環境，從而提高它們的廚餘消耗率。借助IoT系統，溫度和相對濕度分別成功控制在25°C-35°C和70%左右。用了我們附備自動調整系統的箱來養殖黑水虻之後，它們的廚餘消耗量對比起原來130克的消耗量增加了一倍。我們的系統還為黑水虻的發育提供了一個階段分隔隔間。除了消耗廚餘外，黑水虻本身也具有很高的商用價值，可以生產各種產品。因此，黑水虻代表了一種全新的廢棄物資源化利用方式，它的耗能量低，而且產值很高。在黑水虻的幫助下，我們不但可以解決社區的廚餘問題，還能夠為世界變得更美好而做出貢獻。

Linple Mask



HOMANTIN GOVERNMENT SECONDARY SCHOOL

何文田官立中學

Kwan Man Ho 關文浩
Wong Wai Man 黃煒文
Cheung Wai Ho 張煒壕
Yip Chi Kei 葉芷其

These days, we live in a world in which pandemics and air pollution rage on.

Under the pandemic, wearing masks has been mandated as a life-protecting gesture. Though, it limits our facial expressions and feelings during communication, in which the vitality of the city has been affected.

To palliate the exacerbation of these phenomena mentioned, our team comes up with a mask, which is capable of eliminating the distance between people and bringing back the vitalistic city. And that is why it is named "Linple Mask" - A Mask to link up people.

Our model consists of three parts.

Firstly, the mask itself. It is designed with transparency, LED light silicone tubes and customization are added to it. It also has two interior ventilators with replaceable filters, which are capable of providing the user with fresh but safe air. Since our team tends to achieve continuous development, the replaceable filters can filter airborne particles and the ventilators can be charged wirelessly.

We have also designed a wireless rechargeable mask container with an automatic disinfection function. Apart from the wireless charger, the wavelength of the UVC light strips used is about 250 nm. Also, it is safe for everyone to use as the IR sensor inside will protect the users from direct interaction with the UVC.

Lastly, an air quality sensor will be connected to the mask and monitor the content of certain pollutants in ambient air. The sensor will judge whether the content exceeds a particular standard.

在永無止境的疫情下，我們被迫戴上遮蓋容貌的外科口罩。即使保障了健康，人與人之間卻因此出現了隔閡，城市的活力也早已不復存在。

為緩解COVID-19大流行和其他社會及環境情況，我們製作了名為Linple Mask的口罩，以消除人與人之間的距離及恢復曾經擁有的活力城市。而Linple Mask亦寓意連接人們。

我們的模型分為三個部分。

首先，口罩內部帶有可更換過濾器的呼吸機，能夠為用戶提供新鮮而安全的空氣。中間連接的氧氣管可以讓過濾後的空氣有效通過。這是一個可重複使用的口罩，而且可以無線充電。

至於外觀，口罩採用透明設計，讓用戶們得以看到彼此的面部。我們還添加了供用戶定制的功能。

我們亦設計了具有自動消毒和無線充電功能的口罩容器。除了內置的無線充電器，我們有一個外傳感器，它會在容器關閉時自動打開波長約為250nm的UVC燈帶。容器也可以被人安全地使用，因為當它打開時，燈帶會停止運作，從而杜絕與任何與用戶的直接接觸。

第三，空氣質量傳感器將連接到面罩並監測環境空氣中某些空氣污染物的含量。傳感器會判斷內容是否超過特定標準。然後，應用程序將通知用戶相應的結果。

STRUCTURE

架構

EXECUTIVE COMMITTEE

執行委員



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Toby Li, Leo Chau, Elvis Wu, Alex Lee, Andre Yung, Avril Cheng, Anson Wong, Ella Chiu, Stephanie Tam, Kaylee Chan

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Kelly Ho

Minnie Wong

Marco Li

Candy Cheung

Poki Hui

Oscar Pun

Chloe Wong

Jenny Chau

Yasuda Koyo



3rd row Kelly Ho, Charles Tsang, Oscar Pun, Marco Li

2nd row Chili Hui, Candy Cheung, Poki Hui, Taras Wong, Anson Yiu, Candy Lai, Chloe Wong

1st row Toby Li, Stephanie Tam

PAST EVENTS

活動回顧

Preparation Committee Gathering

籌備委員會聚會



The Preparation Committee Gathering was held on 28 December 2021 in Shek O. The Preparation Committee members had a fabulous time taking part in a series of team-building games and indulging in the fulfilling feast. The joyful experience helps strengthen the bonding and deepen the understanding between the members.

籌備委員會聚會於二零二一年十二月二十八日在石澳舉行。在是次聚會中，籌備委員一起參與了一系列的團體遊戲及共享燒烤午宴。這次聚會建立了各委員之間的聯繫，並增進彼此的友誼和互相的了解。

Proposal Competition

計劃書設計比賽

THE 55TH
JOINT SCHOOL
SCIENCE EXHIBITION

THEME:
VITALITY

DEADLINE:
21/1/2022

**PROPOSAL
COMPETITION**

ELIGIBILITY:
A team should
consist of four S3/4/5
or grade 10/11/12 students
from the same school

PRIZE:
Champion: \$2,000
1st runner-up: \$1,500
2nd runner-up: \$1,000

SUBMISSION:
Please approach
your teacher for
the application form

CONTACT:
Leo Chau
Project Affairs Department
Director
9325 8064
leo.chau.55@jsse.org.hk

The Proposal Competition took place from January to March 2022. An adjudicating panel which comprises professors and professionals from different fields was invited to select no more than 30 teams to exhibit their products in the 55th J.S.S.E..

計劃書設計比賽於二零二二年一月至三月期間舉行，並由來自多個領域的教授和專業人士組成的評審團為參賽隊伍評分。評審團亦會從中選出不多於三十隊的優秀隊伍，並於第五十五屆聯校科學展覽展出其作品。

Project Holders' Seminar

展品負責人研討會



The Project Holders' Seminar was successfully held on 5 February 2022 on an online platform. During the Seminar, the J.S.S.E.P.C. and the J.S.S.E. were introduced to the Project Holders from different participating schools. Details of the Proposal Competition such as regulations, marking criteria and guidance on the preparation work were also announced.

展品負責人研討會於二零二二年二月五日以網上形式舉行。講者向來自不同學校的展品負責人介紹聯校科學展覽籌備委員會及聯校科學展覽。此外，研討會中亦公佈了計劃書設計比賽的詳情，例如比賽規則、評分準則及準備工作的指引等。

Proposal Supervising Scheme

計劃書指導計劃



The Proposal Supervising Scheme was successfully held in February 2022 on an online platform. A panel of supervisors consisting of numerous professors and lecturers from renowned local tertiary institutions met the Project Holders in person a few weeks before the deadline for submission of proposals. During the meeting, questions raised by the Project Holders were answered so as to solve the problems encountered when working on the proposal. Inspiring advice was given to the Project Holders so that they could refine their proposals before submission.

計劃書指導計劃於二零二二年二月下旬舉行。由教授和大學講師組成的指導人員於提交計劃書截止日前數星期與展品負責人會面，並解答他們在制訂計劃書時遇到的難題及疑問，藉此給予建議，籍以提高其計劃書水平。

Proposal Interviewing Scheme

計劃書面試計劃



Project Holders were interviewed by adjudicators in April 2022. During the interview session, Project Holders were required to give a presentation on their proposals and to answer questions raised by the adjudicators. This offers the adjudicators an in-depth understanding of their proposals, ensuring objectiveness on the results of the Proposal Competition as well as the selection of teams for the 55th J.S.S.E.. Only those whose scores exceed a certain standard could be able to exhibit their products in the Exhibition.

展品負責人於二零二二年四月上旬與評判會面。在面試的過程中，展品負責人須向評判介紹其計劃書，並回答評判提出的問題。此計劃能使評判對計劃書的構思更為了解，並確保計劃書設計比賽的結果和隊伍選拔的客觀性。在計劃書面試計劃中得分超過一定標準者，方能得到參加第五十五屆聯校科學展覽的資格。

Junior Secondary School Activity

初中學生活動

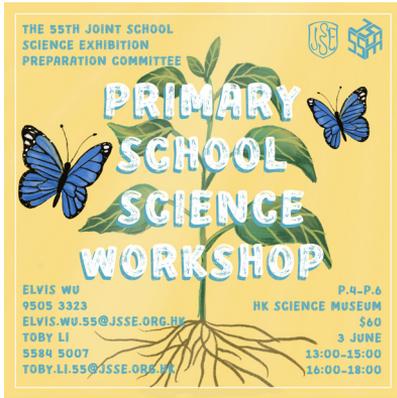


The Junior Secondary School Activity was successfully held on 15 May 2022 at the Hong Kong Science Museum. We are delighted to see the participants from different schools getting along to complete the riveting science-based tasks and experiments in the activity, as well as showcasing their talents and passion towards science.

初中生科學活動順利在二零二二年五月十五日於香港科學館舉行。來自各個學校的初中生合作完成各項有趣的科學實驗，並充分地展示其科學才能，以及對科學的熱情。

Primary School Science Workshop

小學生科學工作坊

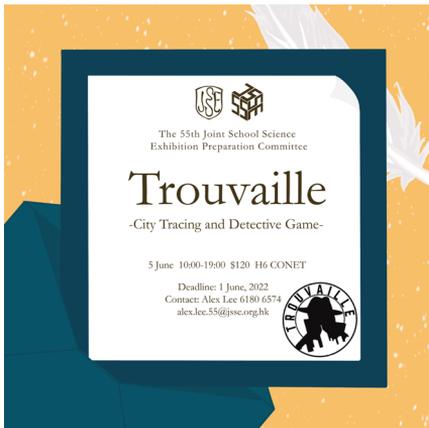


The Primary School Science Workshop was successfully held on 3 June 2022 at Hong Kong Science Museum. We are elated to see all participants actively engaged in the activity, spent time together and developed their interests towards science.

小學科學工作坊在二零二二年六月三日於香港科學館順利舉行。參加者們踴躍參與各項精心準備的活動，一同沉醉在新奇有趣的科學世界裏。

Fundraising Activity — Trouvaille

年度籌款活動

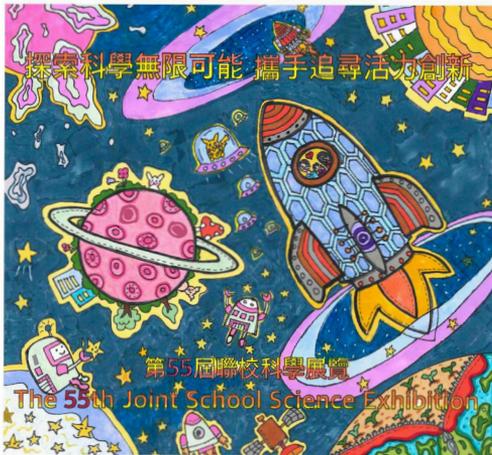


The Fundraising Activity—Trouvaille was successfully held on 5 June 2022. We are ecstatic to witness the devotion of all participants in the game. They demonstrated excellent team spirit by working collectively to complete the challenging tasks and unveil the mystery of the case.

本年度的籌款活動—Trouvaille 於二零二二年六月五日舉行。參加者們在活動中展現出熱心的參與和出色的團隊精神，合力完成各個具挑戰性的遊戲項目以拼湊偵探遊戲內案件的真相。

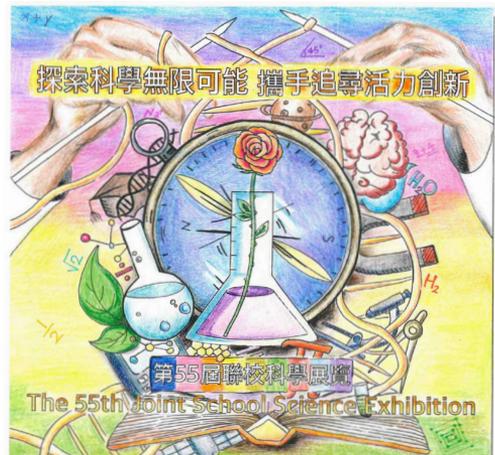
Primary School Colouring Competition

小學生填色比賽



Junior Division Champion
初小組(小一至小三)冠軍

Based on our annual theme "Vitality", the Colouring Competition is held to encourage primary school students to express their passion for science through colouring and drawing. Participants are required to paint and decorate the sheet of sketch to bring out the theme "Science in Creativity, Synergy between Vitality".

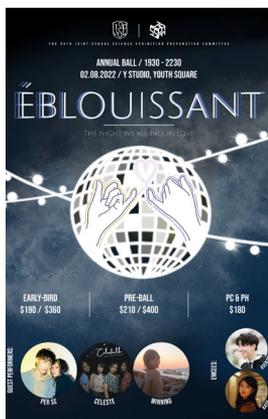


Senior Division Champion
高小組(小四至小六)冠軍

是次比賽是以小學生為對象，旨在配合本年度聯校科學展覽的主題「活力」下，我們希望鼓勵他們以繪畫表達對科學的熱誠。參賽者須在填色紙上添上色彩並添加令人耳目一新的裝飾，對應主題「探索科學無限可能，攜手追尋活力創新」。

Annual Ball — Éblouissant

週年舞會



The Annual Ball was held on 2 August 2022 successfully at the Youth Square Y Studio. Music duo "per se", dance group "celeste" and singer Winning were invited as our guests to perform at the Ball. We hope all participants had a wonderful night and enjoyed the unforgettable moments throughout the Ball.



週年舞會於二零二二年八月二日在青年廣場Y劇場順利舉行明星嘉賓。音樂組合per se、舞團celeste和歌手winning均被邀請於舞會表演。我們希望所有參加者都度過了一個精彩的晚上及留下難忘的回憶。

ACKNOWLEDGEMENT

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University Delegates

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The University of Hong Kong

Project Holders

CCC Kei Yuen College
Tsuen Wan Public Ho Chuen Yiu Memorial College
SKH Bishop Mok Sau Tseng Secondary School
Hong Kong Baptist University Affiliated School Wong Kam Fai Secondary and Primary School (Secondary Section)
St. Joseph's College
TWGHS Sun Hoi Director's College
Man Kwan Pak Kau College
Salesian English School
Kiangsu-Chekiang College (Shatin)
St. Mark's School
Munsang College
Hong Kong Chinese Women's Club College
Christian Alliance College
Bishop Hall Jubilee School
Belilios Public School
Sha Tin Government Secondary School
Aberdeen Technical School
Queen's College
St. Paul's College
Sha Tin Methodist College
Carmel Pak U Secondary School
Homantin Government Secondary School

創新科技署

Innovation and Technology Commission

關於創新科技署

香港特別行政區政府的創新科技署於2000年成立，肩負引領香港成為以知識為本的世界級經濟體系的使命。創新科技署重點工作包括推動和支援應用研究及發展與科技轉移及應用；培養社會的創新科技風氣，促進科技創業活動；協助提供基礎設施和發展人力資源，以支援創新及科技；制定、發展和推行政府的政策、計劃及措施，以推動創新及科技；以及推廣國際承認的標準和合格評定服務，為香港的科技發展和國際貿易建立穩固的基礎。

About Innovation and Technology Commission (ITC)

Established in 2000, the Innovation and Technology Commission (ITC) of the HKSAR Government has been charged with the mission to spearhead Hong Kong's drive to become a world-class and knowledge-based economy. The ITC strives to promote and support applied research and development, and technology transfer and application; foster an innovation and technology (I&T) culture in the community, and promote technological entrepreneurship; facilitate the provision of infrastructure and development of human resources to support innovation and technology; formulate, develop and implement the Government's policies, programmes and measures to promote I&T; and promote internationally accepted standards and conformity assessment services to underpin technological development and international trade etc.

CROUCHER 科學周 SCIENCE WEEK

裘槎科學周是每年春季在香港舉行的年度科學盛事。我們的目標旨在提高社會的科學素養，並彌合科學家與年輕一代之間的距離。我們希望能夠培養年輕一代的對科學的好奇心，並鼓勵他們了解科學對生活的重要性和貢獻，從而建立與科學的聯繫。

Croucher Science Week is an annual science festival held every spring in Hong Kong. Our mission is to raise science literacy within society and bridging the gap between scientists and the younger generation. We hope to nurture scientific curiosity and make science relevant in the daily lives of our younger generation.

了解更多 Learn more at
<https://croucherscienceweek.hk/>



Croucher Foundation
裘槎基金會

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香港工程師學會

9/F, Island Beverley, No 1 Great George Street,
Causeway Bay, Hong Kong

Tel : +852 2895 4446
Fax : +852 2577 7791
Email : hkie-sec@hkie.org.hk
Website : www.hkie.org.hk



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