第五十六屆 THE 56TH JOINT SCHOOL 聯校科學展覽

SCIENCE EXHIBITION

科學跟從節奏
靈感跟隨變奏

SCIENCE WITH RHYTHM
GUIDANCE TO THEOREM

The 56th Joint School Science Exhibition Preparation Committee

The 56th Joint School Science
Exhibition Preparation Committee

PRESENTS

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EDITOR'S NOTE

In 2023, the impact of the pandemic began to recede, allowing our society to gradually regain its footing. Fortunately, we could hold our events as smoothly as before. Hence, leading to the success of building this exhibition up. Hereby, we proudly present the 56th Joint School Science Exhibition to you.

It is my honour to be elected as the Publication Secretary of the 56th Joint School Science Exhibition Preparation Committee. Throughout my tenure, I have acquired a huge amount of precious experiences while working with my colleagues, and the communications between us have become my greatest opportunity to learn. Despite the demanding workload and strict deadlines that had to be met, these obstacles have enriched my growth eventually.

Ten months flew by in the blink of an eye, reflecting the moments when I confronted the intense workload, everything seemed formidable. However, the understanding, patience and support from my colleagues had given me unwavering motivation. The experiences and learnings that I have gained throughout my entire terms of office has driven me to improve a lot in my role with a better me.

I would like to take this opportunity to express my deepest gratitude to Linus and Joycelyn. Their massive assistance made it possible for us to finish this booklet. It was never an effortless job to be the editor of the exhibition brochure, their countless encouragement has cheered me up throughout the times. Now, with great pleasure, we present this brochure to you all.

Lastly, our preparation committee members deserve a mention, as without their outstanding work, the success of the 56th Joint School Science Exhibition would not have been possible. Now, it is the time to witness the result of our ecstatic accomplishment!

Ennis Yip
Publication Secretary
The 56th Joint School Science Exhibition Preparation Committee

FOREWORD

Prof. LEUNG Wing Mo

Adjunct Professor, Department of Land Surveying and Geo-Informations, The Hong Kong Polytechnic University
Former Assistant Director, Hong Kong Observatory

On a hot summer day, watching how the leaves and branches of a tree sway in the wind, or the birds flapping their wings to stay aloft could be wonderful ways to sooth our minds and relieve our stress from the oppressive heat. But if we go one step further, to scrutinize the rhythms of these natural movements for example, we might perhaps come up with innovative designs of more efficient wind turbines by mimicking the way Nature works – something called biomimicry. Who knows, this could become part of the technological solutions to the most pressing issue facing humanity today – the climate crisis.

The connection between rhythm and science may appear nebulous to many, but if one ponders for a moment, we'll come to realize that the natural world is full of rhythmic patterns, from the cycles of the monsoons to the ebb and flow of tides. Researchers have also found that listening to music, and the associated rhythms, triggers the release of several neurochemicals that play a role in brain function and mental health. By harnessing the potentials of rhythm, we might perhaps discover new and innovative ways to advance our understanding of the natural world for the betterment of society.

There is no lack of young and promising scientists in Hong Kong. All they need could be a push in the right direction, and a touch on their shoulders when they achieve something. It needs not be groundbreaking discoveries, just something they have created through application of their scientific knowledge and their creativity. Most importantly, it is about the inspiration and encouragement for them to pursue a path of discovery.

The Joint School Science Exhibition (J.S.S.E.) have done exactly these, and for a remarkable 56 years too. I applaud the decision of the 56th Joint School Science Exhibition Preparation Committee to choose "Rhythm" as the theme of the year, and the untiring efforts of the Committee members to make things happen. As a member of the adjudicating panel of the J.S.S.E. for quite a few years, I embrace all of you to care for and maintain this precious nurturing ground for new talents and innovation in Hong Kong.

FOREWORD

Dr. Wilton FOK

Department of Electrical and Electronics Engineering,
University of Hong Kong
Director of Electronic Learning Exhibition Experimental Room
Director, Motion Artificial Intelligence Experimental Office
Member of the 22nd Joint School Science Exhibition
Preparation Committee

This year is the 56th Joint School Science Exhibition. Thirty years ago, when I was still a secondary six student, I had the honour of representing my school to participate in the Preparation Committee, I had also led the Science Society to participate in the Exhibition.

Participating in the activities organised by the Joint School Science Exhibition Preparation Committee gives us a platform to gain science knowledge, allowing ourselves to fully utilise the science knowledge learnt at school. On top of that, the process of preparing for the Exhibition also expose us to knowledge apart from the science field, furnishing us with valuable experience. For instance, we held a Joint School Christmas Ball that year to help fundraising for the Exhibition, the success of this past activity created a chance for contact and communication among students from various schools, whereas also provided us with opportunities to build a bridge between the Committee and the public, hence allowing us to develop our leadership and cooperation skills.

This year, I am very honoured to be invited by the Committee Members to write this foreword, allowing me to visit the good old memories. Over the past year, I led the Artificial Intelligence Research Team in the University of Hong Kong to participate in the exhibition in Geneva, bringing back two grand prizes, namely Prize of the State of Geneva and Prize of the International Federation of Inventors' Association. I am very grateful for the experience gained in Preparing for the Joint School Science Exhibition as it is definitely one of the crucial reasons for the success.

Therefore, for the 56th Joint School Science Exhibition Preparation Committee and the Project Holders, I strongly encourage you to seize onto this precious opportunity and gain from the valuable experience, hence paving the road for scientific research in the future. I hereby wish the success of the 56th Joint School Science Exhibition.

FOREWORD

Ms. Nicole CHUNG

Chairperson
The 56th Joint School Science Exhibition
Preparation Committee

Science is a collection of interrelated pieces in our daily lives. As technology advances at a tremendous pace, it promotes our circadian rhythm and undoubtedly elevates the quality of life for all. Despite the bright side brought by the advancement, citizens are consequently bothered by the tense living pace created. It has caught my attention that this has indeed casted a shadow over the physical and mental health of citizens. Hence, the 56th Joint School Science Exhibition Preparation Committee has decided to use “Rhythm” as the theme of the year, hoping that scientific products invented and modified under the theme could allow people to fully enjoy their own rhythm.

The Joint School Science Exhibition is our annual highlight, it provides a platform for students to share their works. We hope that we could offer chances for motivated students to showcase their scientific knowledge and creativity. It is only with these outstanding qualities that such unique exhibits could flourish before your eyes. Moreover, we hope to promote the communication between students from various schools and drive them to inspire each other both academically and in other fields besides academics through the Exhibition.

I am honoured to be the Chairperson of the 56th Joint School Science Exhibition Preparation Committee. Through working with several parties, I was fully inspired by their dedication and passion, and gained multiple insights from them.

Meanwhile, I must pay my tribute to the Executive Committee Members for their well cooperation and generous support. Furthermore, recognition must also be given to the Preparation Committee Members. It is with all of their hard work that the Exhibition and all events along the year could be held successfully.

It has been a lucky year for us as the pandemic starts to recede. We are honoured to have the Overseas Delegates and University Delegates at our Exhibition this year. I would like to express my sincere appreciation upon their support towards us that refined the Exhibition to its best. I would also like to thank them for working with us and by demonstrating their continuous passion towards science.

Last but not least, I would like to take this opportunity to express my sincere gratitude towards our sponsors. Thank you for your trust and utmost support towards our committee. The success of the Exhibition and the previous events could not be achieved without your generous support.

Ultimately, on behalf of the whole 56th Joint School Science Exhibition Preparation Committee, I wish the Project Holders every success in the Exhibition and leave a pleasant experience at our Exhibition. We wholeheartedly hope you would be inspired by the works of all exhibitors and please enjoy the Exhibition.

FOREWORD

Mr. Hugo CHEUNG

Vice-Chairperson
The 56th Joint School Science Exhibition
Preparation Committee

"The science of today is the technology of tomorrow," said Edward Teller. Science is an enterprise that should be cherished as an activity of the free human mind. It transforms who we are, how we live, and gives us an understanding of our world by enabling us to pursue and apply our proficiency in both the natural and social world based on evidence.

We were all over the moon when we saw that our society has started to get back on track after the pandemic struck our daily life. However, there are still some uncertainties and challenges we have to face after this devastation. Therefore, the 56th Joint School Science Exhibition Preparation Committee (56th J.S.S.E.P.C.) hopes to cope with this state of affairs by using 'Rhythm' as our theme. When observing our Project Holders making their models, I was greatly amazed by their enthusiasm and eagerness towards scientific investigations. Their willingness to work together and transform their ideas into a practical product has also inspired me a lot.

Thinking back on yesterday when I was taking part in the 55th Joint School Science Exhibition (55th J.S.S.E) as a contestant, I was astonished by the variety of the models and the quality of the products made by different schools. But that one particular thing that raised my eyebrows was the grandeur and magnificence of the Exhibition. The massive amount of booths and the diverting atmosphere had made me forget about the nervousness of being in a competition, especially on the last day when we were signing each other's booklets. After the Exhibition, I have defined an objective for myself to organise an event which is as impressive. Therefore here I am now, honoured to be elected as the Vice-Chairperson of the 56th J.S.S.E.P.C..

Along the journey of being a Vice-Chairperson, preserving close bondings when walking through unexpected circumstances has to be the most unforgettable part. By dealing with these situations, I've gained a myriad of precious abilities that could not be gained in textbooks, from handling outbursting accidents and making critical decisions to communicating effectively and resolving altercations among parties. Without the delegations of all our preparation committee members and executive committee members, it would not be within reach for us to hold this gigantic amount of activities. Therefore, I would like to seize this opportunity to express my profound gratitude to all of the members who helped out in various events, especially the exhibition.

Lastly, after overcoming a huge number of predicaments, the 56th Joint School Science Exhibition (56th J.S.S.E.) has been held successfully. I sincerely wish that the 56th J.S.S.E. can act as a catalyst for the innovation path of science to future technology, while simultaneously providing an environment for the exchange of scientific knowledge. Ultimately, I wish the best of luck to the 57th J.S.S.E.P.C. and I hope you all could enjoy the Exhibition before your eyes.

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 organisation 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 organisation and the number of member schools exceeded twenty. Furthermore, Governor Sir Maclehose 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 56th 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勵教授的協助下，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。踏入第五十六個年頭，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

RHYTHM
節奏

SCIENCE WITH RHYTHM, GUIDANCE TO THEOREM
科學跟從節奏 靈感跟隨變奏

In the midst of the bustling society, as citizens tend to pursue their desired goals, the pace of living intensifies and the physical and mental well-being of the public is put under severe pressure. We seek a regular rhythm of life in order to enhance our living quality, relax our body stress and relieve our mental burdens. In addition, the situation of global warming and pollution worsened, buildings and historical remains were corroded and altered. The collective rhythmic memories of the public gradually fade away, leaving the world in an unfamiliar appearance.

Hence, the 56th Joint School Science Exhibition Preparation Committee has decided to use "Rhythm" as the theme of the year, hoping that science is utilised to maintain the rhythm in individuals, collective memories of society and the ecosystem. Students are expected to probe into three aspects to design their inspiring inventions: adjusting the individuals' circadian rhythm, developing on the collective rhythmic memories in society and maintaining the stability of the ecosystem. We believe that these innovative ideas can help the public to improve the quality of society, as well as the sustainability of the environment.

在繁華的都市中，各人都被生活所追趕，人們的生活節奏遂漸緊張，身心狀態也嚴重受壓。而規律的節奏有助提升我們的生活質素，減輕我們的精神壓力，並有助我們舒展身心。話雖如此，全球暖化和世界各地污染日趨嚴重，導致建築物和遺跡開始變樣，人們的集體回憶逐漸被埋沒，世界也開始變得陌生。

有鑒於此，第五十六屆聯校科學展覽籌備委員會將以「節奏」作為年度主題，希望大眾能夠透過科學來改善生活的節奏，並以調節個人生活節奏、喚起集體回憶及調節生態系統作為切入點，設計創新的發明，從而提高市民的生活質素以及社會可持續發展的可能性。

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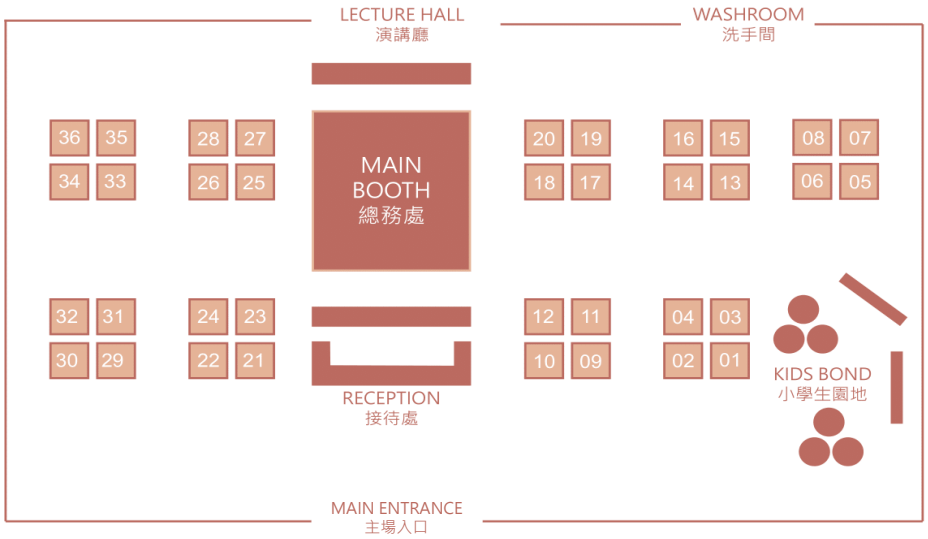
SACRED HEART CANOSSIAN COLLEGE	嘉諾撒聖心書院
SALESIAN ENGLISH SCHOOL	慈幼英文學校
SHA TIN COLLEGE	沙田學院
SHA TIN GOVERNMENT SECONDARY SCHOOL	沙田官立中學
SHATIN TSUNG TSIN SECONDARY SCHOOL	沙田崇真中學
SHUN TAK FRATERNAL ASSOCIATION YUNG YAU COLLEGE	順德聯誼總會翁祐中學
SING YIN SECONDARY SCHOOL	聖言中學
SMKMCF MA KO PAN MEMORIAL COLLEGE	馬錦明慈善基金馬可賓紀念中學
SOUTH TUEN MUN GOVERNMENT SECONDARY SCHOOL	南屯門官立中學
ST. BONAVENTURE COLLEGE AND HIGH SCHOOL	聖文德書院
ST. CATHARINE'S SCHOOL FOR GIRLS, KWUN TONG	聖傑靈女子中學
ST. FRANCIS' CANOSSIAN COLLEGE	嘉諾撒聖方濟各書院
ST. FRANCIS XAVIER'S COLLEGE	聖芳濟書院
ST. FRANCIS XAVIER'S SCHOOL, TSUEN WAN	荃灣聖芳濟中學
ST. JOAN OF ARC SECONDARY SCHOOL	聖貞德中學
ST. JOSEPH'S ANGLO-CHINESE SCHOOL	聖若瑟英文中學
ST. JOSEPH'S COLLEGE	聖若瑟書院
ST. LOUIS SCHOOL	聖類斯中學
ST. MARK'S SCHOOL	聖馬可中學
ST. MARY'S CANOSSIAN COLLEGE	嘉諾撒聖瑪利書院
ST. PAUL'S CO-EDUCATIONAL COLLEGE	聖保羅男女中學
ST. PAUL'S COLLEGE	聖保羅書院
ST. PAUL'S CONVENT SCHOOL	聖保祿學校
ST. PAUL'S SCHOOL (LAM TIN)	藍田聖保祿中學
ST. PAUL'S SECONDARY SCHOOL	聖保祿中學
ST. ROSE OF LIMA'S COLLEGE	聖羅撒書院
ST. STEPHEN'S COLLEGE	聖士提反書院
ST. STEPHEN'S GIRLS' COLLEGE	聖士提反女子中學
ST. TERESA SECONDARY SCHOOL	德蘭中學
STEWARDS POOI KEI COLLEGE	香港神託會培基書院
TACK CHING GIRLS' SECONDARY SCHOOL	德貞女子中學
TSUEN WAN GOVERNMENT SECONDARY SCHOOL	荃灣官立中學
TAI PO SAM YUK SECONDARY SCHOOL	大埔三育中學
TOI SHAN ASSOCIATION COLLEGE	台山商會中學
THE Y.W.C.A. HIOE TJO YOENG COLLEGE	基督教女青年會丘佐榮中學
TRUE LIGHT GIRLS' COLLEGE	真光女書院
TRUE LIGHT MIDDLE SCHOOL OF HONG KONG	香港真光中學
TSANG PIK SHAN SECONDARY SCHOOL	曾璧山中學
TSUEN WAN PUBLIC HO CHUEN YIU MEMORIAL COLLEGE	荃灣公立何傳耀紀念中學
TSUNG TSIN COLLEGE	崇真書院
TUNG CHUNG CATHOLIC SECONDARY SCHOOL	東涌天主教學校
TWGHS LO KON TING MEMORIAL COLLEGE	東華三院盧幹庭紀念中學
TWGHS SUN HOI DIRECTORS' COLLEGE	東華三院辛亥年總理中學
TWGHS WONG FUT NAM COLLEGE	東華三院黃笏南中學
WA YING COLLEGE	華英中學
WAH YAN COLLEGE, HONG KONG	香港華仁書院
WAH YAN COLLEGE, KOWLOON	九龍華仁書院
WEST ISLAND SCHOOL	西島中學
YCH LAW CHAN CHOR SI COLLEGE	仁濟醫院羅陳楚思中學
YCH LAN CHI PAT MEMORIAL SECONDARY SCHOOL	仁濟醫院靚次伯紀念中學
YEW CHUNG INTERNATIONAL SCHOOL	耀中國際學校
YING WA GIRLS' SCHOOL	英華女學校
YLPMSAA TANG SIU TONG SECONDARY SCHOOL	元朗公立中學校友會鄧兆棠中學
YUEN LONG PUBLIC SECONDARY SCHOOL	元朗公立中學

FLOOR PLAN



01	ST01 Science Theatre	科學劇場
03	ST01 Science Theatre	科學劇場
20	SB01 Game Booth	攤位遊戲
09	SB02 Souvenir Booth	紀念品售賣處
27	SB03 Bulletin Board	留言板
06	SB04 Photo Booth	拍照攤位
35	EB01 Innovation and Technology Commission	創新科技處
07	EB02 Caritas Lok Yi School	明愛樂義學校
05	EB03 Hng Kong Red Cross John F. Kennedy Centre	香港紅十字會甘迺迪中心
13	UD01 Department of Physics, City University of Hong Kong	香港城市大學 - 物理學系
14	UD02 The University of Hong Kong iGEM Team 2023	香港大學 - iGEM Team 2023
33	OD01 Singapore Yuan Ching Secondary School	新加坡代表隊
34	OD02 Thailand PSU Wittayanusorn Suratthani School	泰國代表隊
36	OD03 India Sri Prakash Vidyaniketan	印度代表隊

FLOOR PLAN

02	PH14 Salesian English School	慈幼英文學校
04	PH10 Kiangsu-Cheking College	沙田蘇浙公學
10	PH01 Belilios Public School	庇理羅士女子中學
11	PH15 SKH Bishop Mok Sau Tseng Secondary School	聖公會莫壽增會督中學
12	PH18 St. Joseph's College	聖若瑟書院
15	PH08 Hong Kong Chinese Women's Club College	香港中國婦女會中學
16	PH21 Tang King Po School	鄧鏡波學校
17	PH22 The Methodist Church Hk Wesley College	衛理中學
18	PH07 Homantin Government Secondary School	何文田官立中學
19	PH04 Fukien Secondary School (Siu Sai Wan)	福建中學（小西灣）
21	PH23 Tsuen Wan Government Secondary School	荃灣官立中學
22	PH12 Munsang College	民生書院
23	PH13 Queen's College	皇仁書院
24	PH19 St. Paul's College	聖保羅書院
25	PH02 Bishop Hall Jubliee School	何明華會督銀禧中學
26	PH05 Good Hope School	德望學校
28	PH11 Lions College	獅子會中學
29	PH16 SKH Li Ping Secondary School	聖公會李炳中學
30	PH09 Hong Kong Tang King Po College	香港鄧鏡波書院
31	PH03 CCC Kei Yuen College	中華基督教會基元中學
32	PH17 St. Mark's School	聖馬可中學

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**，以表達對不同隊伍的參賽者的支持和鼓勵！

Voting Procedures:

1. Write down your English full name (as shown in the 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

UD01

香港城市大學
City University of Hong Kong

Solid-State Hybrid Quantum Systems: Cavity Quantum Electrodynamics with Macroscopic Spin Ensembles

Department of Physics, City University of Hong Kong

Category: Physics

Person in charge:
Jingyi Fan
Bangyao Wu

Teacher Advisor:
Io Chun HOI

The hybrid quantum system consists of a superconductin g microwave cavity coupled to an ensemble of electron spins hosted by nitrogen-vacancy centers in diamond.

The experiment will be conducted in a dilution refrigerator to cool down to very low temperatures, typically below 25mK. A diamond crystal was placed on top of a planar cavity resonator. The magnetic fields were applied using Helmholtz coil cages. The system will be then measured in transmission using a vector network analyzer.

The main purpose of the experiments is to demonstrate the coherent coupling between cavity photons and electron spins. This experiment also gave us insights into the concept of 'rhythm.' A stable and coherent field is required for the quantum system to perform its operations, which can be considered a vital “rhythm” in the system. These quantum memories, realized by cavity-spin ensemble systems, can store information for extended periods, leading to advances in communication, computation, and simulation.

Overall, this experiment contributes to the understanding and development of hybrid solid-state quantum systems, which have the potenyial to advance quantum technology.

混合量子系統是由超導微波腔和鑽石的氮 - 空位中心所組成。超導微波腔是由共面傳輸線所形成的振蕩器。電磁波在其中將被來回反射形成駐波。在外加磁場的條件下，鑽石氮 - 空位中心的自旋電子系綜通過偶極相互作用與超導微波腔中的駐波進行耦合。實驗將會在稀釋冰箱中進行，其環境溫度將會降低到 25 mk，以避免熱擾動。我們把鑽石放置在超導微波腔上面，通過三維亥姆霍茲線圈來調節磁場強度和方向，以及用矢量網絡分析儀進行量測來獲取頻譜數據圖。由於自旋電子系綜帶來的集體增強耦合效應，微波腔和氮 - 空位中心將能夠實現強耦合。實驗上，我們可以研究腔光子和自旋電子系綜的交互作用，這有助於探索強耦合在量子信息處理，量子通訊等領域的潛在應用。

CAR-MA

The University of Hong Kong
iGEM Team 2023
Category:
Synthetic Biology

Person in charge:
Polly Zhou
Sze Tsz Yan
Geng Yirong
Lam Wing Hei
Chiu San Bo

Teacher Advisor:
Dr SUGIMURA,
Rio Ryohichi

Immunotherapy has been gaining popularity in treating cancer patient in this decades, examples like CAR-T has been proved efficient in treating liquid cancer. However, when applied to solid tumour, there is a significant decrease in its efficacy owing to the presence of Tumour Micro-Environment (TME). Acting as a physical barrier TME prevents macrophages from reaching the solid tumour. Moreover, M2-like phenotype tumour-associated macrophages (TAMs) in TME would promote tumor growth, invasion, and leads to immunosuppression of T cells/ CAR-T cells.

To tackle such technical barrier, our igem team this year has planned to work on immunotherapy treatment for solid tumour from two approaches, using HepG2 as the model cell line.

1. Delivery of RNP targeting SIRP-a through lipofection

Solid tumour were known to express CD47 on its surface to manipulate SIRPa-CD47 pathway, allowing them to circumvent being targeted by phagocytosis. Through assembling Cas9 protein and gRNAs targeting SIRP-a domain into Ribonucleoprotein (RNP), we could achieve site-specific cleavage and thus disabling the CD47-SIRPa axis and enhance effciency of phagocytosis.

2. Delivery of CAR using self-replicating RNA (srRNA/ saRNA) or piggy-bac as a vector

Being a low cost vector that can be simply manufactured, srRNA was opted to carry our designed chimeric antigen receptor (CAR) targeting GPC3 into macrophages. Using ribosomes in host cell, the srRNA can be quickly amplified and translated without genomic integration, rendering it a safer and more efficient vector when compared to traditional viral vector. As for the CAR construct, besides enhancing phagocytosis, the 3rd generation CAR will also possess the ability to induce expression of polarising factors like IFN-gamma to transform M2 state macrophage back to M1 state. A suicidal switch that automatically degrades the CAR if it was wrongly presented is also incorporated into the CAR construct. Besides srRNA, the piggy-bac approach might be adopted, which allows us to incorporate the CAR sequence into the genome of the host cell.

OD01

Yuan Ching Secondary School, Singapore
新加坡耘青中學
Category:
Applied Science

Person in charge:
Ma Haoyao 馬浩耀
Xiavier Li Ruikai 李睿凱
Thierry Zhang Xuanhao 張烜豪
Fan Xiaojing Nicholas 樊笑精

Teacher Advisor:
Mr.Chen Zhanjiang
陳展江老師

Use of alternative energy sources more efficiently to grow crops sustainably

Urban farming is part of Singapore's plan to increase its food security, with the plan of producing 30 percent of the food the country consumes by 2030. With the scarcity of land in Singapore, only 1% of its land is used/ Allocated land used for farming is thus only standing at 1%. Hence, the need to 'grow more with less' is of great significance and interest to Singapore. The Singapore government hopes to leverage technology to create multi-story LED-powered vegetable farms which can produce up to 10 to 15 times more output vegetables than conventional farms.

During the period of Covid-19 restrictions, urban farming among Singaporeans picked up. Participation in urban agriculture may also contribute to positive mental health and brings with it the benefits of physical activities. Hydroponics farming is widely adapted in Singapore and a natural energy source for Singapore that can be easily tapped is solar power. Our research will attempt s to dive deeper into the 'Use of alternativenatural energy sources more efficiently to grow crops sustainably'.

The research aims to study the feasibility of the integration of using solar power to power sensors which helps to create the ideal farming conditions for optimum crop production. With temperature being a key factor in determining the growth of crops, sensors could be deployed with the help of microcontrollers to activate a low-cost misting function as a form of ambient temperature regulator. The closed system of solar panels, sensors and microcontrollers allows us to harness the abundance of solar energy and reduce our dependence on electricity from the grid. This would be critical for Singapore's climate in the months of April to June where the country experiences a surge in temperature.

The research project is targeted to be carried out from the period May – July 2023. The variables, conditions and data to be collected are is summarised below.

Variables to test
Variant 1: Misting to occur at every 1/2/3/4-hour interval
Variant 2: Misting to occur only when ambient temperature reaches a certain point

Data to be collected
1. Temperature tracking at regular intervals over the entire growth period of the vegetation.
2. Humidity of ambient surrounding
3. pH of the water used for irrigation
4. Conductivity of the water used for irrigation

Study of tones characteristics in Thai, Chinese language and some animal sounds using Fast Fourier Transform (FFT)

PSU Wittayanusorn Suratthani School, Thailand
Category:
Applied Science

Person in charge:
Isika Rodcharoen
Ratanakorn Jindapol

Teacher Advisor:
Miss Sitanun Pumkaew

The Thai and Chinese languages are tonal languages. Tones are the core of the language. Tones distinguish the meaning of one word from another. Thai and Chinese languages are two of the languages that use tones for communication of information. Thai language uses consonant sound symbols to indicate how the words should be pronounced correctly. Otherwise, we cannot understand the meaning of the words if they have the same tones but different symbols or characters. To speak Thai or Chinese correctly in terms of meaning the tones of the words must be pronounced correctly. This research work was to study the tone characteristics of Thai and Chinese languages using Fast Fourier Transform (FFT) to analyze the frequency patterns of the 5 tones in Thai language and 4 tones in Chinese language. Apart from the tone characteristics of these language, some animal sounds were also studied using FFT to obtain sound spectra of animal of several kinds.

Software Audio tools on a mobile phone from Studio Six Digital, U.S.A. to analyze the audio signals was used. FFT, or Fast Fourier Transform takes a time-varying input signal and transforms it into a frequency spectrum. The FFT algorithm is a mathematical procedure that breaks a signal into frequency bins. Each bin is the same size in Hertz. The voice signals of the various tones are recorded and analyzed by FFT.

The results of FFT analyzer are shown in the figure. The voices of different persons (male or female) will give different frequency spectrum band. But the patterns of voice spectrum are the same only the variations of the frequency set. The figure shows a typical set of voice spectrum of the five tones.

Each syllable is pronounced with one of five distinct tones – Mid, Low, Falling, High and Rising. The middle tone starts at a middle pitch level of about 113 Hz (typically). The low tone starts low about 93 Hz. The falling tone starts high and falls to a low pitch, from 128 Hz to 88 Hz. The high tone rises at 138 Hz. The rising tone starts at low-level and gradually rises from 91 Hz to 145 Hz. Figure shows a more technical analysis of the pitch (frequency) of over time. There are 5 tones in Thai language. But there are only 4 tones in Chinese Language: Mid, Low, Falling, and Rising.

From experimental measurements of the sound spectrum of animals, it was found that each animal species such as mammal amphibians aquatic and birds give obviously different sound spectrum. Some animal sounds are compared between real animal sounds and fake animal sounds using a paper cup and string to generate sound imitating the real sound of that animal.

Therefore, when comparing the sound spectra of animals such as geckos, cats, and hens, it was found that all 3 species had different sound spectra. But when comparing all three types of fake sounds with the real ones, it was found that the fake sound from the paper cup had a sound spectrum like sound from the real animals.

OD03

SRI PRAKASH VIDYANIKETAN
day - cum - residential school
VISAKHAPATNAM

SRI PRAKASH VIDYANIKETAN
VIZAG, India

Category:
Applied Science

Person in charge:
Mr. Digavalli Venkat Kushal
Mr.Gopal Chetty Yugaratna

Teacher Advisor:
Ms. Kona Malin

SWIPE AND DRIVE

The traffic accident rates are high in almost all countries. Reckless driving is the primary cause of the alarming increase in the statistics of road accidents all over the world. Especially teenagers can be referred to here, as they are highly influenced by the social and developmental status of different countries.

Teenagers are often known for their recklessness. When teen drivers hit the roads, they don't always know to do the right thing. Moreover, lack of experience in cautious driving ends up in fatal accidents.

Identification of these factors is an essential task in prioritising safety treatment programs, so that proper planning, organizing, execution and efficient budgeting of the same can be implemented. Collection of road accident data of around forty one countries helped us in creating this project.

We have worked on this project to make people understand the possibility of hindering the careless drivers from taking vehicles onto the roads. The project 'Swipe and Drive' also enables the generation of responsibility in teenagers as well as their parents who tend to consciously look into the need of their children To abide by all the requirements, to be rightful road users.

Effect of emotional stability and awareness in an interactive sensory environment for students with intellectual disabilities

Caritas Lok Yi School

Category:
Interactive Sensory Environment

Person in charge:
Ms Ho Wing Yan

Teacher Advisor:
Principal Mok Oi Ling

Multi-Sensory Environments are relaxing spaces that help reduce agitation and anxiety, but they can also engage and delight the user, stimulate reactions and encourage communication (Snoezelen, 2023). Sensory room is widely used in special education in Hong Kong. Caritas Lok Yi School has completed an action research study on the "Learning Outcomes of Students with Intellectual Disabilities in the Sensory Room" in 2022. 14 students aged from 6 to 18 with severe intellectual disability (SID) or moderate intellectual disabilities (MOID) having multiple medical conditions were involved. All subjects attended individual sessions once per week for 8 weeks. Results showed that students had improvement when learning in an interactive sensory environment in the aspects of motor, sensory response and emotional control. In this exhibition, the team applied the visual and auditory stimulations mainly used in the sensory room to show how an immersive sensory environment could impact on emotion and awareness.

Autistic Spectrum Disorder (ASD) and visual impairment such as cortical visual impairment
(CVI) are common diagnoses in children with SID or MOID. Children with ASD might be hypersensitive to surrounding stimulations, affecting their emotion, while people with CVI are more sensitive to certain colours. Equipment in the sensory room can be controlled by the user and change to a preferable colour and a suitable level of stimulations, in turn helping students with ASD calm down or facilitate the awareness of students with visual impairment.

By experiencing the immersive environment of a sensory room with different visual and auditory stimulations through 360° video, participants can explore how students with intellectual disabilities learn in a sensory room. They can also enjoy those calming light effect and rhythm of the natures for stress relief.

多感官環境是放鬆的空間，有助於減少焦慮和不安，同時也能夠吸引並讓使用者感到愉悅，刺激反應並促進交流（Snoezelen, 2023）。感官室在香港的特殊教育中被廣泛使用。明愛樂義學校於 2022 年完成了一項關於「感官室對智障學生學習成果的影響」的行動研究。參與其中的是 14 名年齡介於 6 至 18 歲之間，患有嚴重智障（SID）或中度智障（MOID）以及多種醫療狀況的學生。所有受試者每週參加一次個別課程，持續 8 週。結果顯示，在互動感官環境中學習時，學生在運動、感官反應和情緒控制方面有所改善。在這個展覽中，團隊將主要用於感官室的視覺和聽覺刺激應用，以展示沉浸式感官環境如何影響情緒和意識。

自閉症譜系障礙（ASD）和視覺障礙，如皮質視覺障礙（CVI），是智障或中度智障兒童常見的診斷。患有 ASD 的兒童可能對周圍的刺激過敏，影響他們的情緒，而患有 CVI 的人對某些顏色更為敏感。感官室中的設備可以由使用者控制，並且可以變換成喜好的顏色和適當的刺激程度，從而幫助安撫 ASD 的學生或促進視覺障礙學生的意識。

通過 360° 視頻體驗感官室中不同的視覺和聽覺刺激，參與者可以探索智障學生在感官室中的學習方式。他們還可以享受那些平靜的光線效果和自然的節奏，以紓解壓力。

EB03

Facilitating Students' Motivation and Skills Internalization by using Rhythmical Intention, Music and Visual Stimulation

Hong Kong Red Cross John F. Kennedy Centre

Category:
Applied Science

Person in Charge:
Lee Chung Man

Teacher Advisor:
Ou Yang Wie Yeh

Our staff have been working as a trans-disciplinary team to initiate a project "Facilitating Students' Motivation and Skills Internalization by using Rhythmical Intention, Music and Visual Stimulation" and the details of the rationale are as follows:

1. Music and memory
Students remember what they have learnt (knowledge and skills) by applying what they have learnt repeatedly or linking up newly learnt information with their previous knowledge or experiences. Therefore, songs with music rhythm and melodies that are easy to remember, and lyrics with repeatedly contents or

2. Music and emotions:
Recently, functional neuroimaging discovered that music can effectively regulate the part of the brain responsible for emotions. Different combinations of rhythms, speeds, tones, and melodies in music can arouse different emotions. Songs can help build a relaxing and happy mood for students and improve learning efficiency.

3. Music and muscle development:
Listening to the songs or watching the videos would motivate the students to do the actions or movements by following the lyrics or images. The lyrics and animations are specially designed for our students. Lyrics are written by breaking movements or tasks down into simple and straight forward steps with elements of basic motor patterns (基本動作模式) under Conductive Education, with special sentence structure starting with 'I' and use of rhythmical intention. Combined with animation providing information on body positions and joint motions to pay attention to with suitable tempo, students can practise desirable movement patterns systematically and build up muscle memory to improve range of motions, muscle strength and coordination for functional tasks.

We believe that this project would help our students develop positive attitude and sense of self-discipline as well as acquire the self-caring and social skills, especially at their early age. It would definitely lead them to be more independent and engaged in an inclusive society.

我們的員工一直以跨學科的方式合作，啟動了一個名為「運用節奏意圖、音樂和視覺刺激促進學生動機和技能內化」的項目，其背後的理念如下：

1. 音樂與記憶
學生通過不斷地應用所學 (知識和技能) ，將新學習的信息與之前的知識或經驗聯繫起來，以此記住他們所學的內容。因此，具有易於記憶的音樂節奏和旋律，以及包含重複內容或節奏意圖的歌詞，將有助於學生內化並建立具有強大檢索能力的長期記憶。

2. 音樂與情感：
最近，功能性神經影像學發現音樂可以有效地調節與情感相關的大腦部分。音樂中不同組合的節奏、速度、音調和旋律可以喚起不同的情感。歌曲可以幫助學生建立輕松愉快的情緒，提高學習效率。

3. 音樂與肌肉發展：
聆聽歌曲或觀看視頻將激勵學生按照歌詞或圖像的指示進行動作或運動。歌詞和動畫是專為我們的學生設計的。歌詞通過將動作或任務分解為基本動作模式元素，並以「我」開頭的句子結構和節奏意圖來書寫。結合提供有關身體位置和關節運動信息的動畫，以合適的節奏，學生可以系統地練習理想的運動模式，建立肌肉記憶，改善運動幅度、肌力和協調性，以應對功能性任務。
我們相信，這個項目將幫助學生培養積極的態度和自律精神，並獲得自我照顧和社交技能，尤其是在他們的早期階段。這無疑會使他們更加獨立，參與一個包容的社會。

UltraWhθθlchair
波坡轆碌

Designed to enhance accessibility for the disabled, UltraWhθθlchair is a voice-commanded wheelchair with object detection and centre of gravity (COG) adjusting system.

The wheelchair is equipped with an ultrasonic sensor that detects objects within 1.5 m; a sound warning will be emitted at this distance. If an object is within 1 m, the wheelchair decelerates to rest to prevent collisions. Also, a speedometer measures the speed of the wheelchair. Sound will be emitted only if its speed exceeds the average walking speed to prevent false alarms.

Additionally, the COG adjusting system, consisting of a metal ball, a conveyor belt and electromagnets, are placed under the seat in a chamber. The accelerometer detects the inclination of the road, which determines the degree of shifting of the COG. The conveyor belt transports the ball towards the corresponding electromagnet to be attracted. The COG moves forward when ascending slopes and backwards when descending. This keeps the line of weight within the region between the point of contact of the front and rear wheels to prevent toppling; users can access slopes of larger inclination without leaning forward and backward. Furthermore, the wheelchair is voice-activated. A wireless noise-cancelling microphone receives verbal orders, which the voice recognition system converts into signals, controlling the movement of the wheelchair. This enhances the autonomy of users with upper limb disabilities and facilitates multi-tasking including reading maps or making phone calls.

With UltraWhθθlchair, users' pace of life is maintained while ensuring their safety.

波坡轆碌是輛有避障碰撞功能、重心調整系統和語音控制系統的電動輪椅，銳意為使用者打造便利生活。

首先，避障碰撞功能中超聲波感應器檢測外物距離：1.5 米內會發聲警告，1 米內則自動煞車。速度計會量度輪椅速度，只有當其高於正常行人速度 3.2km/h 時才會響鬧，以免在沒有安全隱患時誤響。

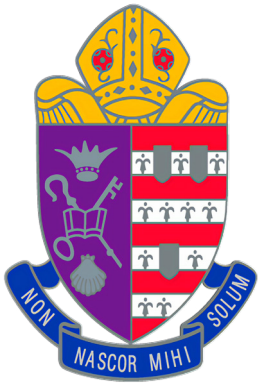
其次，艙室是由一個鐵球、一系列電磁鐵和傳送帶組成，置於座位下的艙室。鐵球會被傳送帶運送到相應的電磁鐵的位置和被吸住，從而轉移重心。由於作用力線得以維持在前、後輪的接觸點之間，輪椅傾覆的機會減少。 另外，加速度計會量度坡度。自動調整輪椅重心不僅能擴大可行駛的斜度範圍，亦能避免使用者為保持重心而將身體傾前仰後的潛在危險。

再者，語音控制系統中，無線降噪麥克風連接 Arduino 語音識別模組，使用者以口頭命令控制電動輪椅，語音識別技術會將其轉換為對應信號。此系統可提高操作便利及自主性，使用者可在駕駛時進行其他操作，如查看地圖、打電話。

總括而言，波坡轆碌能改善輪椅使用者的生活節奏，同時保障安全。

Belilios Public School
庇理羅士女子中學
Leung Fantine 梁詠絮
Ngan Sze Yi 顏詩怡
Mak Ka Ching Karen 麥加澄
Tu Chin Chin 杜芊芊

PH02



Bishop Hall Jubilee School
何明華會督銀禧中學
Ng Yuen Ho 伍遠豪
Lam Hiu Ho 林曉浩
Li Hin Fung 李衍鋒
Li Kwan Ho 李鈞濠

E.G.O., Electricity Generator Omni
E.G.O., 全方位發電機

Electricity Generator Omni, for short E.G.O., is an electricity generator but has the feature of being universal.

Recently, both our lives and our Mother Nature are losing their natural rhythm. Statistics show that about 25% of Hong Kong citizens lack of physical activities, resulting in numerous negative health effects. On the other hand, climate change leading by global warming is worsening. Reduction of greenhouse gases production should act at once.

In order to restore the healthy rhythm to both our lives and nature, we try to create an electricity generator that can be attached to non-polluting transportations such as bicycles, roller blades or scooters. The electricity generated will be used in charging users' mobile devices. We hope that it can provide incentive for users to perform more physical activities in their daily lives, even when they are commuting.

To make it more attractive, users can customize the appearance according to their personal style and individuality. The design can be changed by the user at anytime according to their favour. We hope that E.G.O. not only can help reducing carbon emission, but also as a sign of being stylish.

Electricity Generator Omni,簡稱E.G.O.,是一台具有通用功能的發電機。

近年來,人類及大自然的節奏漸漸被破壞。根據統計顯示,約有 25% 的香港市民缺乏足夠的體能活動,對健康產生了諸多負面的影響。此外,全球暖化引致氣候變化的問題正在惡化,令人擔憂。這表示溫室氣體的排放須盡快減低。

為了重建我們的生活及大自然的節奏,我們的團隊希望透過一種通用的發電機,它可以連接到不同類型的非排放式的交通工具如單車、滾軸溜冰鞋和滑板車等。產生的電力能為使用者的移動裝置充電。我們希望可以激勵用戶在日常生活中進行更多的體能活動,即使是在上下班途中也能夠輕鬆使用。

除此之外,用家可以以根據自己的喜好來選擇發電機的外觀,亦可以隨時隨地更改。我們希望 E.G.O. 除了節能減碳之外,亦可以是一種潮流的表現。

HydraBump
悠油丘

Does a speed bump make you uncomfortable when you are driving a vehicle? Our redesigned speed bump features a hydraulic and water filtration system. It is more user-friendly for drivers as the car moves slowly to prevent itself from lifting .The HydraBump efficiently uses the weight of the car to filter when vehicle passes through it. The hydraulic damper is comprised of a hydraulic fluid, a piston, a damping valve and an oil seal. When the speed bump is compressed quickly, the shock absorber is pressurized, and the damping force increases correspondingly .Through this mechanism, the shock absorber stands firm and makes the car wobble to warn drivers to slow down. On the contrary, when the shock absorber is compressed , it relaxes and the damping force decreases. This process lowers the speed bump and it presses close to the ground. This reduces the vibration of vehicles. A water pump directs the flow of water to the filter system for watering. The pressure generated by the car compresses the pump ,and allows the system to filter wastewater. This physical filter uses filter media such as sand and rocks to remove impurities in wastewater.

Finally, the water is passed through the power generator. An electric generator is installed to generate a small amount of electricity for lighting. The high speed of water can turn the blade to produce electricity. HydraBump can improve the rhythm of the road and transportation. Apart from that, it saves water resources, relieves the pressure of sewage treatment and power usage.

車輛經過減速丘時，你是否會因震動而感到不適？

我們所設計的減速丘內含液壓阻尼器，是用於控制機械運動的速度和力度的零件。減速丘被快速壓縮時，避震器就會加壓，從而使減速丘變硬，使車輛搖晃，提醒駕駛者減速。車輛緩慢經過時，使減速丘被慢速壓縮，避震器便會減壓，車輛重量從而使梯形減速丘變形，貼近地面，減少對車輛的搖晃，不會如一般減速丘拋起車輛，令到駕駛者不適。

我們於展品底部加裝淨水裝置，並接駁水泵，以善用每一次汽車駛過路丘而產生的壓力，作初步淨水的用途。透過水的流動循環不斷， 可以達到持續收集及輸出污水的功能。

最後，利用被水泵加速的水流，使渦輪的葉片快速轉動，帶動線圈在磁鐵的兩極間轉動，使線圈內的磁場改變，令發電機產生電流。

我們希望展品可以調節道路使用者的節奏，提供一個更安全的環境，減輕污水處理的壓力和能源消耗，實現現今社會所追求的可持續發展和邁向智能城市的目標。

CCC Kei Yuen College
中華基督教會基元中學
Lo Ching Yin 盧政言
Lam Ho Long 林浩朗
Ho Lok Hang 何樂恆
Lo Chung Yuen Will 羅眾圓

PH04

Fukien Secondary School (Siu Sai Wan)
福建中學 (小西灣)

Yeung Ho Ching 楊皓程
Kwok Siu Fung 郭肇鋒
Cheng King Siu 鄭景兆
Choi Yuen Lam 蔡沅霖

SUNRISE
日出

The sunrise alarm clock is a device that uses light to help people wake up. When light enters our retina, it affects the pineal gland in the brain through neural transmission, thereby affecting the secretion of hormones. Adequate light can cause the brain to secrete serotonin, making people energetic and cheerful. However, a lack of sunlight directly leads to insufficient secretion of melatonin, affecting sleep, and thereby affecting the body's physiological rhythm and mental state.

The sunrise alarm clock simulates the lighting effect of sunlight, allowing people to wake up naturally. In addition, for groups that often work at night or people with irregular day and night schedules, the sunrise alarm clock can help them maintain a normal circadian rhythm, thereby improving their quality of life and health status. When people have a regular biological clock, their bodies can better adapt to different environments and rhythms, thereby improving the body's adaptability and resistance.

Using a sunrise alarm clock is very simple. Just place the alarm clock next to the bed, set the time, and face the light towards your face. When the time comes, the sunrise alarm clock will automatically start and gradually increase the intensity of the light, allowing you to naturally wake up from sleep. Compared with traditional alarm clocks, sunrise alarm clocks can reduce the sudden loud noise stimulation to the body, and can better simulate the effect of natural light, helping people to get up more comfortably.

日出是一個利用光照射協助人們起床的鬧鐘，當光線進入我們的視網膜後，通過神經傳導影響大腦裡的松果體，進而影響荷爾蒙的分泌。

充足的光線可以使大腦分泌血清素，讓人的活力充沛、心情開朗。但缺少陽光照射，會直接導致褪黑素分泌不足，影響睡眠，進而影響人體生理節律和精神狀態。

日出鬧鐘通過模擬太陽光的光照效果，從而令人自然起床。另外，對於需要經常夜間工作的族群或者日夜作息不規律的人來說，日出鬧鐘能幫助他們維持正常的晝夜節律，從而提高生活品質和健康狀態。當人們有規律的生物鐘時，他們的身體可以更好地適應不同的環境和節律，從而改善身體的適應能力和抵抗力。

使用日出鬧鐘非常簡單，只需將鬧鐘放置在床邊，設置好時間，並將光照面對著您的臉部。當時間到達，日出鬧鐘會自動啟動，逐漸增強光線強度，讓您自然地從睡眠中醒來。相比傳統的鬧鐘，日出鬧鐘能夠減少突然響鬧的聲音對人體的刺激，且能夠更好地模擬自然光線的效果，幫助人們更加舒適地起床。

Pianotricity

Good Hope School
德望學校
Cheng Chit Tun 鄭婕彤
Mui Chin Yee 梅千萱
Chang Hong Yau 鄭康悠
Wong Pui Lam 黃沛霖

Pianotricity: Electricity Generation from Playing the Piano

Pianotricity harnesses energy from playing piano keys to efficiently generate usable electricity via strategically positioned piezoelectric generators. Piezoelectric elements are firmly attached beneath piano keys and wired to charging cables through converters. When keys are pressed, piezoelectric materials convert the mechanical strain into electric current that accumulates to efficiently charge mobile devices.

Goals of the project include providing a sustainable and environmentally friendly alternative electricity source by utilizing a common hobby. Encouraging regular piano playing also aims to reduce phone addiction while simultaneously giving pianists an additional incentive. Piezoelectric theory is applied by appropriately combining various materials and following proper construction procedures to optimise energy conversion. An inexpensive practice piano is initially utilized as a cost-effective prototype.

The prototype consists of a practice piano, several piezoelectric disks of varying sizes, copper wire, welding equipment, charging cables and convertors. The positive terminals from all piezoelectric elements are connected to one copper wire and the negative terminals are joined together by another copper wire. The copper wires are then wired to a charging cable converter. When piano keys are pressed during play, the accumulated electrical energy generated by the piezoelectric elements flows through the circuit to effectively charge devices.

This project demonstrates an ingenious technique for harnessing wasted mechanical energy from a common but enjoyable activity to generate usable and sustainable electricity while simultaneously promoting a beneficial hobby that can improve people's lives through music.

「琴中帶電」利用敲擊鋼琴樂鍵產生的動能通過壓電發電器有效地生成可用電能。壓電元件牢固地附著在琴鍵底下，並通過線纜與充電器相連接。當按下琴鍵時，壓電材料吸收機械應變而產生電流，使其有效充電。

該項目的目標在於提供一種可持續和環保的替代能源，利用普遍的愛好來滿足需要。項目運用壓電理論，結合不同的材料和構建過程，最大化能量轉換。最初運用經濟實惠的普通鋼琴作為原型。

原型包括普通鋼琴、壓電元件、銅線、焊接設備、充電器和轉換器。所有壓電元件的正極連接在一起，負極也連接在一起。這兩個銅線隨後連接到轉換器。當彈奏鋼琴時，壓電元件產生的電能給設備充電。

這個項目展示了一種巧妙的技術，利用日常活動產生的浪費機械能量有效地生成可持續電力，同時強化有益的愛好來改善人們的生活。

「琴中帶電」措施將改變傳統看待鋼琴的方式。不再僅僅視其為娛樂和藝術的工具，更充分利用這種樂器的潛在價值，獲取可持續能源。普及這一創新技術，將鼓勵更多人培養音樂愛好。

PH07

HOMANTIN GOVERNMENT SECONDARY SCHOOL
何文田官立中學
Liu Pik Yiu 廖碧瑤
Shen Chun Yin 沈俊賢
Huang Tak Fai 黃德輝
Mok Sze Wan 莫思韻

SHIning Angel
心晴寶寶

"S"aying comforting words to "H"eal "Individuals' soul, "SHIning Angel" is an Angel to all of us, designed to regulate individuals' pace and rhythm of life.

"SHIning Angel" is incorporated with different sensors and speakers. People are often too busy to have a break for meal or a long-deserved rest. "SHIning Angel" can detect users' lifestyle status and give suitable reminders to draw users' attention to take good care of their well beings. Elderly without relatives around may have some recorded warm reminders from beloved ones, to remind them to take pills or have enough clothing to stay warm when necessary. Moreover, "SHIning Angel" can respond according to individuals' mood and give comforting words to ease their minds.

"SHIning Angel" is tailored-made to individuals' needs. Individuals can choose their own Angel and the settings required. Thus, every "SHIning Angel" is unique.

Through possessing "SHIning Angel", we hope people can embrace a happier and healthier lifestyle, in a good mood to shine in every walk of life.

有些人在急速的生活節奏裏，被工作或其他生活壓力所壓迫，缺乏照顧自己的時間和心力，各種疾病往往也隨之而來；另一方面，又有些長者因乏人照顧，不在意生活應有之節奏。我們希望透過一個能提醒使用者健康訊息的玩偶 – 「心晴寶寶」，調節大家的生活節奏。在「心晴寶寶」的提醒下，能騰出一點時間來照顧自己，使自己擁有健康的身心。

「心晴寶寶」備有不同傳感器，並內置發聲裝置，當使用者因生活繁忙而廢寢忘餐時，會因應情況發出溫馨提醒；又如使用者是長者，亦可預先錄下家人親切話語，提醒長者記得依時服藥或因應天氣轉冷而添衣等。玩偶亦可因應使用者的情緒， 說出安慰的話語，令我們能得到暖心的提醒和陪伴，心靈得到安慰。

每個「心晴寶寶」均因應使用者的需要而作設定，使用者亦可自選玩偶。因此，每個「心晴寶寶」均是獨一無二，為使用者度身而設。

我們希望「心晴寶寶」能成為大家生活的間奏，能在繁忙生活中歇息片刻，又或是缺乏陪伴時尚有暖心提醒，找到適合自己的生活節奏，在不同的生活節奏裏仍會有一絲甜。

我們期望，每個人也擁有屬於自己的「心晴寶寶」，能夠在不同的行業或年紀也能調適屬於自己的生活節奏，天天擁有健康好心情！

Silver-nanoparticle antibacterial film

Hong Kong Chinese Women's Club College
香港中國婦女會中學
Choy Tsz Kin 蔡子鍵
Iu Yu Mei 姚雨薇
Wong In Laam 黃謙嵐
Chan Chong Chi 陳昶志

Our project presents an eco-friendly way to synthesize silver nanoparticles in aqueous medium, using two natural biodegradable polymers (alginate and chitosan) as the reducing agent and the stabilizing agent.

Alginate (a polyanion) can form cross-links with chitosan (a polycation) to produce a polyelectrolyte complex (PEC) to hold the silver nanoparticles. After the PEC suspension is evaporated naturally to dryness, a stable water-insoluble film is formed.

We have carried out a series of fair tests to study the optimal conditions for this synthesis. The experimental results suggest that the optimal temperature is 90℃ , the optimal silver ion concentration is 0.01M and the optimal alginate concentration is 0.2%.

The silver-nanoparticle film made under such conditions has a satisfactory shelf life, and is found to have significant antibacterial activity against E. coli bacteria by agar diffusion method. Besides, the film is tested to be water-insoluble, water-resistant and sufficiently tough.

Therefore, we believe that the silver-nanoparticle film of our design can effectively be applied in food packaging and wrapping of medical devices. With further studies and improvement, the film may contribute to some applications in biotechnological and biomedical fields.

Furthermore, to manufacture the silver-nanoparticle film in a sustainable way, we propose the government may consider the possibility of sorting and extracting the major raw materials, alginate and chitosan, from the kitchen waste.

我們的項目提出了一種在水性介質中合成納米銀並形成薄膜的環保方法，使用兩種天然可生物降解的聚合物（藻酸鹽和甲殼素）作為合成反應中的還原劑和穩定劑。

藻酸鹽（一種聚負離子）可以與甲殼素（一種聚正離子）形成交聯，產生一種聚電解質複合物 (PEC) 來固定銀納米粒子。 當 PEC 懸濁液通過自然蒸發至乾燥後，會形成穩定的水不溶性納米銀薄膜。

我們進行了一系列的公平測試來研究該合成方法的最佳條件。實驗結果表明了最佳合成溫度為 90℃， 最佳銀離子摩爾濃度為 0.01M，而最佳海藻酸鹽濃度為 0.2%。

我們發現在最佳條件下製備的納米銀薄膜具有令人滿意的保質期，並且通過瓊脂擴散法發現薄膜對大腸桿菌具有顯著的抗菌活性。此外，我們經測試後發現該薄膜不溶於水、防水且具有足夠的韌性。

PH09

Emulsifying petroleum with the natural surfactant - coco-glucoside

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Chan Hin Hang 陳衍行
Lee Hei Yin 李曦賢
Chan Ka Ho 陳家豪

Everything exists within nature, and there is a rhythm to it that contributes to its beauty and the order of the world. Nature is an awe-inspiring presence for human beings, but its balance is gradually being disrupted by destructive human activities. This investigation aims to address the prevalent oil spill problem through eco-friendly approaches to help restore the natural rhythm and improve the ecosystem.

Typical methods used to solve an oil spill problem include using barriers or booms to contain the spill or burning the petroleum. While these methods are proven effective, their largest drawback is that they can produce other contaminants at the same time. To address this problem, the investigation is taking an approach that involves emulsifying oil spills by using biodegradable and more natural materials than those currently in use.

Emulsifying petroleum allows the oil spill to undergo biodegradation more efficiently in the aid of bacteria in the sea. Aligned with the goal of the investigation, coco-glucoside was selected as the research target due to its natural properties. As the investigation progresses, experiments were conducted to examine the effectiveness of the product resulting from the chemical reactions of mixing and heating coconut oil, ethanoic acid, and glucose. The coco-glucoside obtained from the experiments showed effectiveness in emulsifying oil.

However, the cost is relatively high. In order to produce coco-glucoside with a more effective emulsifying effect in an economical and eco-friendly way, further research and investigation are necessary in the future.

萬事萬物皆有節奏，大自然也有其節奏韻律，但因為人類的活動（例如：漏油事故）破壞了大自然的節奏，而最終，人類只會自食其果。本研究希望透過尋求更佳、更有效解決油污的方法為切入點，調節生態系統、改善人類生活質素。解決油污問題普遍的做法是燃燒石油，或抽取和撈出石油。雖然這些方法可行，但大部份卻不夠天然，在消除油污後亦會產生其他污染。為此，本研究的理念是用天然的方法解決油污問題。

產品利用天然的介面活性劑使石油乳化，使海上存在的細菌能更有效將油污進行生物降解。取決於介面活性劑的天然程度，本研究將椰油苷作為研發目標。把椰子油、果酸、糖融合，並且進行高溫加熱，椰子油和糖在果酸的催化下進行化學反應，產生化合物椰油苷。經過測試後，亦證實到產品能乳化石油。由此可見，本產品能以天然、有效的方法解決油污問題。

雖然產品有功效，但成本卻相對的較高。希望可以在未來的研究以更低廉和有效的材料製作此產品，使產品能在現今的社會應用。

Aromatic room

Kiangsu-Chekiang College (Shatin)
沙田蘇浙公學
Tang Ka Yi 鄧家沂
He Siu San 何紹燊
Zeng Kei Chun 曾記進
Yu Shu Qi 余書琪

Due to the dirty environment and the quite significant unpleasant odour in public restrooms, many people have a very bad impression on them. The gross odour often makes people uncomfortable and hence avoid using public restrooms. As a result, people tend to hold their urine until a toilet with an acceptable sanitation level is found, rather than using the restrooms where awful smell constantly evolves. This may possibly lead to the disruption of their excretion rhythm, which is already known to have various negative effects on people's physical health, such as urinary tract infection, bladder stretching, kidney stones, etc. Hence, they may have a poorer life quality and lower life expectancy.

In order to alleviate the disgusting odour, we aimed at reducing the ammonia formed by the hydrolysis of urea from the urine left in toilets after urination, which is the major source of the irritating smell in most restrooms. This is achieved by reacting sodium hydrogencarbonate and citric acid to absorb heat and to lower the temperature, so as to inactivate urease and other bacteria which catalyses the above hydrolysis reaction, and to inhibit the formation of unpleasant odour. Meanwhile, some other perfumes are also installed nearby to cover the minor amount of already existing smell and provide people with a more comfortable aromatic environment.

Hopefully, people would be more willing to use the clean and tidy public restrooms whenever they need to, without the necessity of giving way to our mental requirements with the price of physical suffering.

提及公共廁所時，許多人往往聯想到「骯髒」和「惡臭」兩詞。由於其散發出的噁心氣味常常使 人感到不舒服，因此人們盡可能避免使用公共廁所。所以，在找到一個可接受的廁所或直到回 家前，部分人都寧可更於忍住尿意，也不使用臭氣熏天的廁所。久而久之，這會導致他們的排 泄節奏被打亂，這種習慣已經被證實可以對人們的健康產生了各種負面影響，如尿道感染、膀 胱伸展、腎結石等，令生活質量更差，嚴重者更的預期壽命更會因此而降低。

為了減輕並消除公廁中令人作嘔的氣味，我們可減少排尿後留在廁所裡的尿素水解所形成 的氨氣，即是刺激性氣味的主要來源。通過結合碳酸氫鈉和檸檬酸，便可以吸收尿素產生的熱 量並降低溫度，最終抑制尿素酶和其他催化上述水解反應的細菌，從而減少難聞氣味的形成。 同時，附近亦安裝了芬芳劑，在抑止惡臭根源的基礎上帶來令人舒適的氣味，為人們提供一個 更理想的如廁環境。

希望每個人都可以在需要的時候使用乾淨衛生的公共廁所，而不必以身體痛苦為代價來滿 足我們的精神需求。

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香港人集體回憶 — 「白飯魚」

Lions College
獅子會中學
Lin Wen Li 林雯麗
Siu Ho Hang 蕭可恆
Lau Hiu Pan 劉曉彬
Chan Chung Yin 陳頌言

Canvas shoes first appeared in the UK in 1861. In Hong Kong, we have given our canvas shoes a very Hong Kong name - "rice fish".

Our products are sold to middle-aged and elderly people. In the 80s and 90s, rice fish was the designated sneaker for physical education classes in primary and secondary schools at that time. "Rice fish" is full of childhood memories for them, a mark of youth. Through this project, we hope that this group of middle-aged people will regain their sense of youth and regain their own rhythm.

By analyzing the morphology and material of the sole of rice fish, we proposed an improvement using UV photosensitive powder and GPS as an improvement plan. Using UV photosensitive powder to make the shoe changing color under sufficient ultraviolet rays to prompt the user to take sun protection measures to avoid sunburn.

In addition, we added GPS function to the rice fish, which can avoid the elderly with dementia from going missing, so that the family can know the location of the elderly in real time. In addition, we also studied the waterproof performance and made some waterproof coating design suggestions. When the rice fish sneakers are waterproof, we can wear this pair of rice fish with peace of mind whether it is rainy or humid.

帆布鞋最早在英國於 1861 年出現，原意是設計給工人於海邊行走，不容易讓沙粒進入鞋裏面，然後發現帆布鞋不只是適用於沙灘行走，抓地力高又舒適，越來越多人穿來做運動。

而在香港，我們為帆布鞋賦予了一個很有香港特色的名字——「白飯魚」。我們產品的銷售對象是中老年人。八九十年代，「白飯魚」是當時中小學上體育課指定穿着的運動鞋。「白飯魚」對他們來說充滿著童年回憶，是青春的印記。我們希望透過此計劃令這班中年人找回青春的感覺，重拾屬於他們的節奏。

我們通過對白飯魚鞋底的形態和材料進行分析，提出了一種利用 UV 感光粉及全球定位系統作為改良方案。利用 UV 感光粉，讓鞋在足夠的紫外線下變色，以提示使用者作防曬措施，以免曬傷。

另外，我們在白飯魚中加入全球定位系統功能，可以避免患有認知障礙症的老人家走失，讓家人可以實時知道老人家所在的位置。此外，我們還研究了防水性能，並提出了一些防水塗層設計建議。當白飯魚運動鞋具有防水性時，無論下雨天還是潮濕的天氣，我們都能放心地穿著這雙白飯魚。

Intelligent Zen Mattress (IZM)

Munsang College
民生書院
Hung King Hang 洪景珩
Zhou Le Ran 周樂然
Chan Tsan For 陳讚科
Lu Zhao Ji 盧兆基

Sleeping is a crucial part of human life. It is estimated that a person spends about 26 years sleeping in their life. Yet, people suffer from great pressure due to the swift living pace nowadays, leading to poor sleeping quality.

Named Intelligent Zen Mattress (IZM), the device aims to make users have a better sleeping quality by a combined effect of sound, aroma and temperature, creating a 'world' that is anxiety-free.

Heart rate corresponds to sleep stages, with shallower stages yielding higher temperatures and deeper stages lower ones. Sensors can measure heart rate, sending data to an Arduino that adjusts current, controlling the switches.

Our brain produces theta waves in the light sleep stage and delta waves in the deep sleep stage. By hearing binaural beats with these frequencies, our brain can synchronize its dominant brainwave frequency with that of the external stimulus. Hence, it makes a person enter these stages of sleep easier and faster.

Chemical smells can have a powerful effect on our sleep quality by triggering specific responses in our brain and body. Certain smells, such as lavender, have been shown to be particularly effective in promoting relaxation, reducing stress, and improving sleep quality.

Temperature is also a big factor in sleeping. 14 degrees Celsius provided by our water circulation in the mattress will be the best temperature for sleeping since your brain can be stimulated and give a response of slowing down the body mechanism, and as a result, you can take a good rest.

睡眠是人類生活的重要部分。 據統計，人一生中大約有 26 年在睡覺。 然而，現代人生活節奏快，壓力大，因而睡眠質量差。 該設備名為智能禪床墊，旨在通過聲音、香氣和溫度的綜合作用，讓用戶擁有更好的睡眠質量，創造一個沒有焦慮的世界。

心率與睡眠階段有關。 較淺的睡眠階段會導致較高的溫度，而較深則反之。通過傳感器測量心率後，傳感器會發送數據到 Arduino。Arduino 其後分析數據並向繼電器模塊傳送指令，控制電流的大小， 從而啟動或關閉各組件。

我們的大腦在淺睡眠階段產生 θ 波，在深睡眠階段產生 δ 波。當在聽到帶有這些波段的雙耳節拍時，我們的大腦可以將其主導的腦電波頻率與外部刺激的頻率同步，從而使人更快地進入這些睡眠階段，從而提升睡眠質素。

薰衣草的香氣能夠激活副交感神經系統（負責調節身體休息時的無意識行為），引發幾種生理反應，有助於減少壓力荷爾蒙的產生，從而促進放鬆和減輕壓力。

溫度絕對是決定你睡眠質素的重中之重。根據實驗指出，十四攝氏度為最佳睡眠溫度，當你身處於此溫度，大腦便能透過皮膚感應，並作出減少新陳代謝的反應，帶你進入溫柔的夢鄉。

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Queen's College
皇仁書院
Wong Ka Hei 王家熙
Lee Pak Hei 李栢熹
Fu Sze Ho Edison 傅思皓
Yeung Wai Kwan 楊懷堃

CantoGeM
粵韻悅富瑰

The name of our product is 'CantoGeM'. By generating (hence "Ge") songs that match the lyrics, we hope that our product can help users utilize music (hence "M") to enhance their memory and work efficiency. Meanwhile, Cantonese (hence"Canto") and its derived culture can be promoted.

The idea for our product came from our difficulties in memorizing text during studying. Inspired by one of our chemistry teachers, who combined music withacademic content to help students with memorizing information, we designed this product, hoping to make memorization easier.

Our product analyzes the melody-tone of the lyrics inputted by the user, generating a corresponding singable melody with the help of Artificial Intelligence. Users can sing along with the lyrics, linking music and words. This consolidates memory through musical mnemonics, and additionally shortens the required time for memorization, relieving the user's stress. It can also be used by songmakers to prototype a working melody as it generates a downloadable midi file, a common music instruction system used by digital audio workstations.

Our model is trained based on the Cantonese 9-tone system, showing off what makes it so special, helping promote the language as well as its contribution to a unique musical culture. We hope that our product can bring joy to our users' lives, while encouraging them to learn more about the uniqueness of their culture.

我們的產品名為「粵韻悅富瑰」,此名字表達了我們設計此產品的目標——生成配合粵語語言聲調變化的音樂,讓使用者能夠利用音樂提升效率,並增強記憶力,以紓緩壓力,同時發掘及推廣獨特的粵語文化。

此產品的靈感源自我們在背誦課文時遇到的艱辛。我們希望找到提升背誦效果的方法,便聯想到我們的一位化學老師也利用音樂結合學習內容,協助同學記誦。因此,我們設計了此產品。

此產品通過分析用户所輸入文字的音調高低,再以我們設計的人工智能程式處理,生成配合音調變化的旋律。使用者可用文字哼唱旋律,將文字與音樂連繫起來,不但可形成更牢固的長期記憶,而且可縮短記憶過程。此舉更同時有助紓緩使用者的壓力。由於此產品會產出音樂數位介面文件,它還可被用於旋律雛形的編寫。

此外,此產品所依賴的粵語音調系統,充分展現了它由於保留了不少中古漢語的聲調系統,因此擁有較多聲調變化的特色。此產品因而有助更多人瞭解粵語的寶貴之處,從而推廣粵語及其音樂文化。我們期望此產品能幫助使用者減輕壓力,在枯燥生活中增添趣味,同時認識更多自身文化的獨特。

Re:RATrix
篩方。淨土

During the COVID-19 pandemic in the past few years, the usage of rapid antigen test (RAT) has become part of our daily routine. This leads to a significant amount of single-use plastics being disposed of, which cause serious pollution to the environment. Therefore we invented "Re:RATrix" , a reusable RAT device to address this issue.

"Re:RATrix" is a three-layered RAT device made of biodegradable plastics. The first layer is for inserting test strips to carry out quick test, the second layer is for storing different test strips, and the bottom layer is for storing moisture beads. After each test. Users simply need to remove the test strip and disassemble the first layer for disinfection, the whole device can then be reused. Users can also customize the appearance of the first layer with their own patterns, or choose our preset designs with landmarks of Hong Kong which evoke our collective memories to this city.

In addition, "Re:RATrix" not only is capable of COVID-19 testing, but also is applicable for using other test papers, including those targeted for diabetes or pregnancy testing. Users can purchase different combinations of test strips according to their needs, which provide more choices and flexibility to them.

To conclude, "Re:RATrix" is an environmental-friendly, reusable RAT device which reduces usage of single-use plastics to protect our ecosystem and environment. Other than being practical, this device also allows customization and provides flexibility to users to suit their "rhythm of life"

過去數年疫情肆虐，每日進行快速測試成了市民生活的一部分。然而，這卻導致大量一次性塑膠被棄置，造成嚴重的環境污染。為此，我們研發出「篩方。淨土」，一個可重複使用的試紙測試裝置以對應此問題。

「篩方。淨土」是由可生物降解的塑料製成，包含三層間格的快測裝置，第一層為插入試紙進行快測的地方，第二層儲存不同的試紙，而最底層則存放防潮珠。在每次測試完畢後，用家只需簡單地移除試紙，拆卸第一層消毒便可以重複使用。就第一層的外觀，用家可自行設計圖案，亦能選擇我們預設的香港地標圖案，以喚起我們對這城市的集體回憶。

此外，「篩方。淨土」不僅適用於COVID-19 快速測試，亦適用於其他類型的試紙，如糖尿病試紙和驗孕試紙等。用家可根據個人需求自由配搭購買試紙，這提供了更多的選擇和靈活性。

綜上所述，「篩方。淨土」是環保、可重複使用的試紙測試裝置，幫助減少一次性塑料產品的使用，以保護生態環境。除實用外，裝置亦容許客製化和為用家提供靈活性，以合乎用家的生活節奏。

Salesian English School
慈幼英文學校

Woo Kwan Yin Ericson 胡鈞然
So Bo Cong 蘇柏璁
Lui Lap Tin 呂立天
Wang Zi Wei 王子維

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SKH Bishop Mok Sau Tseng Secondary School
聖公會莫壽增會督中學
Wu Jing Wen 吳靜雯
Ho Sheung Sue 何想雪
Huang Yi Min 黃伊敏
Yan Wai Yan 嚴慧欣

Symphonic Fil·ture
濾·植之聲

Nowadays most people are under pressure from the hectic modern life, and water pollution has become a serious issue over the decades. Seeing this, we investigate a device that can relieve their stress while purifying sewage water. Our model is made up of two major parts. One is the filter column and the other is the plant music.

The first part, filter column, consists of five components. They are gravel, sand, activated charcoal, calcite and silica-alumina composite. Gravel, sand, activated charcoal and calcite are responsible for removing heavy metals and maintaining the pH range of the filtered sewage water around 5-7. For silica-alumina, as we discovered that Metformin, a medicine used to treat diabetes, has actually caused a great impact on the ecological environment–making fish 'hermaphrodite' or sterile, we choose silica-alumina composite as a layer of filter to filter it out due to its hydrophilic and adsorption properties.

After the filtration process, the pH level of the sewage is regulated to a more neutral state, which is more suitable for plants to take up. By collecting the pH value of sewage before and after the filtration, we make use of this change in pH of sewage to conduct musical variations. Then, the change in pH is converted to a corresponding note by a program we designed. Additionally, the tone of the music will be harmonious. In this way, people can relieve their stress by irrigating the plants and we hope this could encourage people to slow down their pace.

在現今的繁華都市，人們生活節奏緊湊，逐漸忽視越趨嚴重的水污染問題。看到人們忙於生活沒時間處理家居污水，我們設計了一個裝置，旨在減輕水污染的同時，創造輕鬆的音樂改善人們的情緒。該裝置分爲兩部分：濾水裝置及植物音樂。

濾水裝置由五層濾料組成：礫石、沙子、活性炭、方解石和氧化鋁硅複合材料。污水過濾後的酸鹼值會在 5-7 之間，重金屬的含量也能控制在適合植物的水平。對於矽鋁複合材料，因其親水性和吸附性能，它能過濾一個近年常見的污染物，二甲雙胍——這款治療糖尿病的藥物會使魚類"雌雄同體"，對生態環境造成影響。

隨後，這些過濾後的污水將被用於澆花。通過收集植物下泥土在灌溉前後的酸碱值變化，配合我們設計的程序，我們將這些數據轉變成聽得到的音樂，再透過揚聲器播放。不同的酸鹼值將對應特定的音符，因此在不同環境下能夠聽到獨特的植物音樂。同時，我們會將數據進行處理，利用不同的音樂部分進行和聲，以得到更加和諧的變奏。

濾水改善環境，變奏舒緩身心。我們希望以植物獨特的音樂，讓人們感受大自然的旋律，一同重拾美好的環境與心境。

Interweaving Sound and Light: Focus Enhancement
聲光交錯．專注加持

SKH Li Ping Secondary School
聖公會李炳中學
Lam Pui Wa 林沛華
Wong Tsz Yui 王梓睿
Chen Si Han 陳思涵
Lau Sing Yu 劉星宇

"Interweaving Sound and Light: Focus Enhancement" is a focus tool designed to improve learning efficiency. It combines white noise, brown noise, and multiple colours of LED lights to create an environment that promotes learning. The inspiration for this innovative product came from a deep consideration of education and learning, with the aim of addressing the problem of declining student concentration in modern times.

In today's society, students face tremendous learning pressure. To help them improve learning efficiency, we have studied various learning tools and methods. In the process, we found that white noise, brown noise, and multiple colours of LED lights can effectively improve student concentration.

The working principle of the tool is that white noise and brown noise can mask environmental noise, helping students to concentrate. LED lights can also adjust students' emotions and psychological states. For example, blue light can help improve concentration, green light can make people feel calm, and red light can help enhance attention.

This tool is not only suitable for learning but also for other situations that require concentration, such as writing, reading, working, and research. It also has volume and brightness adjustment functions, allowing users to adjust according to their own needs.

In summary, " Interweaving Sound and Light: Focus Enhancement " effectively assists students in improving learning efficiency and concentration by combining white noise, brown noise, and multiple colours of LED lights.

" 聲光交錯．專注加持 " 是一款致力於提升學習效率的專注工具。它結合了白噪音、棕噪音和多種顏色的 LED 燈光，為學生創造一種促進學習的環境。此創新產品的靈感來自對教育和學習的深度思考，以解決現代學生專注力下降的問題。

在現代社會，學生面臨著巨大的學習壓力。為了幫助他們提升學習效率，我們研究了各種學習工具和方法。在這過程中，我們發現白噪音、棕噪音和多種顏色的 LED 燈光能有效提升學生的專注力。

工具的運作原理是，白噪音和棕噪音可以遮蓋環境噪音，幫助學生集中注意力。而 LED 燈光則可以調整學生的情緒和心理狀態。例如，藍色燈光有助於提升專注力，綠色燈光能讓人感到寧靜，而紅色燈光則有助於提升注意力。

這款工具不只適用於學習，也適用於其他需要專注的情境，如寫作、閱讀、工作和研究。更有音量和亮度調節功能，讓使用者能根據自身需求進行調整。

總的來說，" 聲光交錯．專注加持 " 結合了白噪音、棕噪音和多種顏色的 LED 燈光，有效地協助學生提高學習效率和專注力。

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Destress - Solving Stress Problems through Music

St. Mark's School
聖馬可中學
Lau Tsz Lam 劉子霖
To King To 杜景滔
Au Issac 區冬陽

DeStress is an app designed to help people reduce stress and improve their work performance through the use of scientifically validated sounds and music. The app offers a variety of pre-categorized audio options that users can select based on their mood or activity, such as relaxation, focus, or sleep. The app's interface is user-friendly, allowing for easy navigation. By using DeStress, individuals can experience the benefits of sound therapy, including increased relaxation, improved productivity, and better sleep quality.

DeStress 是一款旨在透過使用經科學驗證的聲音和音樂，幫助用家減少壓力並提高工作表現的應用程式。該應用程式提供了各種預先分類的音頻選項，用戶可以根據自己的心情或進行中的活動進行選擇特定模式，例如放鬆、專注或睡眠等。應用程式的界面易於導航，對用戶非常友好。通過使用 DeStress，用戶可以體驗聲音治療的好處，包括增加放鬆感、提高生產力和改善睡眠質量。

M-Starchion

St. Joseph's College
聖若瑟書院
Lee Hok Lam 李學霖
Ng Cheuk Hang 吳焯衡
Lam Sheung Fai Alex 林尚暉
Leung Tze Yui Darryl 梁子睿

The water cycle has long been one that is imperative to all living organisms: its rhythm — the regular repeated pattern of movement rings with life because water is the start of life. However, as bustling developments take place so has pollution caused severe detriments on these once peaceful rhythms, disrupting their natural balance and cycle causing adverse effects on the entire ecosystem. Heavy metals from various sources such as industrial waste, and accidents within battery recycling facilities all contribute to this alarming stumbling block.

On the other hand, radiological pollution has aroused discussions that have been heated up recently. Nuclear wastes can enter waters in the form of radioactive ions, which are extremely dangerous to organisms of all types. These injurious chemicals contaminate our water cycle and are particularly hard to treat in aqueous solutions. They thrust into the once peaceful rhythm, not only corroding the wellbeing of organisms in nature but also that of humans as well.

Herein, we aim to provide a solution — introducing MStarchion. In our project, we utilise starch, which is biodegradable and cheap, being modified with a chemical called crown ether. It can successfully “trap” metal ions, through interactions between chemical species at a microscopic level, to form an insoluble solid complex which can be removed then treated easily.

萬物滋長有賴水循環，由於水是生命之始泉，它的韻律亦伴奏著生命的旋律。然而，隨著發展，地球上的種種污染對這些一時燦爛而精致的韻律造成了嚴重破壞， 破壞的是自然中的平衡，環環相扣，污染物便殃及整個生態。工業廢物、家用廢舊電池的不當處理等，都是重金屬污染之源頭，這些重金屬是造成這問題的元凶，實在令人堪憂。

此外，核污染成為了近日熱議之一。經過核反應，不少放射性物質會以放 射性離子的形式流進海洋。深遠而言，它們對於有機體是極為危險的。這些有害化學物質會污染水循環，且在水溶液中特別難以處理。它們一旦「闖進」了安寧的水循環，就不僅加害於自然界的生物，也加害於人類。

故此，我們提供一個解決方案——引入MStarchion。我們的項目使用可生物降解、無毒、廉價的澱粉，並用冠醚進行改性。建基於其化學特性，聚合 物可以成功「捕獲」金屬離子，所形成的沉澱物不溶於水，可被輕鬆去除再處理。

對比其它淨水手段，此手段較為具針對性和高效，因為它對於水可以說是零傷害，吸附物隨後亦可容易循環再重用。

PH19

St. Paul's College
聖保羅書院
Xiao Guanze 肖冠澤
Chan Tsz San Etha 陳梓燊
Yiu Chung Him 姚頌謙
Meng Youchao 孟幼超

AquaGrhythm

The AquaGrhythm device is designed based on the principles of aquaponics, and it aims at growing ornamental plants or microgreens, such as micro broccoli and micro chard. These plants are of higher nutritional value per unit mass as compared to typical vegetables and provide a lively atmosphere to their surroundings.

The device operates on a water cycle system that creates a self-sustaining ecosystem between fish and plants. Fish manure is utilized as a source of minerals to promote plant growth while chemical energy from fish food and light energy from sunlight support the growth of fish and photosynthesis of plants respectively. This creates a small-scale ecosystem which provides energy and nutrients for plant growth.

Users can interact with the system by removing moss from the device and feeding the fish to maintain the well-being of the ecosystem. This process allows them to observe the recurring changes of molecules in an ecosystem and gain a better insight into the working principles of ecosystems without visiting the countryside.

Moreover, the device could also address the issues related to the fast pace of life in Hong Kong by encouraging people to take breaks during their daily schedules and immerse themselves in the minuscule nature enclosed in this small device. This device serves not only as an ecosystem, but also as a companion that brings peace and joy to life.

The AquaGrhythm device provides more opportunities for relaxation and enjoyment, while adding more greenery to indoor environments in the city. It raises awareness among citizens about nature and promotes education related to ecosystems, as well as encouraging people to protect them and uphold sustainable development. Ultimately, it decorates the city with natural elements, contributing to a more eco-friendly future.

我們產品的設計理念源於魚菜共生，目的是室內可培養園藝植物和微型菜苗。

產品採用封閉式水循環系統，在魚類和植物之間建立一個自我循環的生態系統：魚類排泄物含大量礦物質，能為植物提供所需養分。同時，魚食中的化學能為魚類提供能量，而陽光則提供了植物進行光合作用所需的光能。它們的相互作用，形成了一個微型生態系統，能夠為植物提供所需的養分和能量，從而茁壯成長。

另外，用家需定期換水，清理苔蘚和魚類排泄物，以保持生態系統處良好狀態。亦可通過餵養魚類來參與循環系統的運作流程，觀察分子在生態系統中的循環變化，從而深入了解生態系統的運行原理。

此外，產品的設計理念亦緊扣「節奏」這個主題。在忙碌的生活當中，人需要適當休息以緩解工作帶來的壓力和疲勞。該產品可讓人在百忙中抽空放鬆，沉浸在微型的大自然中。

我們堅信，此產品可為人多帶一分放鬆、十分愉悅。同時也為城市間的室內環境提供更多綠色生態，增進人們對自然環境的認識和關注。

CurTaIn - an advanced remake of curtains with automation

Tang King Po School
鄧鏡波學校

Yip Chin Wai Alvin 葉展瑋
Yeung Hoi Kit 楊凱傑
Cheung Sang Yu 張生儒
Wong An Ching 黃晏澂

Beneath the glistening night sky a silver plate hangs high above. The stars shine their glamour with the white moon but alas they are no match for our bright city lights, glowing left and right they radiate though your curtains to you who is about sleep. Once more the chirping birds die out as the golden sun sets within the west, that which takes its place are roaring engine battling the silent night. This scene is a daily occurrence for us who dwell in metropolises, however as the sands of time flow away we lose precious hours of sleep to such sounds, resulting in a reduced productivity. This phenomenon is one that must be addressed and hence we thought of a solution, the CurTaIn.

CurTaIn is a multipurpose smart curtain that works together with all kinds of smart furniture. As one of the most common household items in the city it carries the duty of stoping light and facilitating air circulation, nowadays we hope to make it both smart and practical. All one must do is set up the time you need CurTaIn to “awaken”, just like an alarm clock allowing you to wake up to sunshine and soothing music from our speakers. It can also control the amount of natural light entering your room, assuring a fresh day every day.

CurTaIn has an endless future, it may not seem like much but it promises to improve a long and important problem. CurTaIn, the curtain of tomorrow.

隨著夜幕降臨，汽車的引擎聲仍在黑夜中爭吵不斷。此刻的城市，仍然光亮一片。七彩的霓虹光芒穿過窗戶，與手機屏幕耀眼的光線一同映射在睡床上即將就寢的人，令人們睡意全消。這便是都市人的夜晚寫照。久而久之，人們漸漸喪失寶貴的睡眠，令生產力下降，心情煩躁。見此情況，我們的腦海浮現出用作解決睡眠問題的 CurTaIn。

CurTaIn 是一個讓多樣智能家具聯動合作的工具。窗簾，作為城市常見的家具之一，它身兼阻擋光線和促進空氣流通的功能。如今，CurTaIn 將此體驗變得更加智能化和便捷。它能提醒您睡覺的時間並為此營造合適環境 — 您只需像設定鬧鐘般事先在手機程式中選擇需要 CurTaIn 提醒之時間，CurTaIn 便可控制進入室內的自然光，同時使用喇叭播放音樂，助您適時入睡或在溫暖的日光中蘇醒。最終讓你重拾健康的生活節奏。

CurTaIn 的未來是無限的。除了在短期內協助用戶改善睡眠質素外，更能繼續擔任智能家具的樞紐中心，持續發揮作用。你可以想像它可以是一幅畫，點綴家居。它又可以是過濾室外進入室內空氣的工具。CurTaIn，讓您的家居變得更智能化、更舒適，生活便可以變得更愜意、更自在、更健康。

PH22

The Methodist Church HK
Wesley College
衛理中學

Fung Ching Lam 馮靖琳
Cheung Hong Ching 張康晴
Leung Hiu Lam 梁曉琳
Pong Wing Yiu 龐潁遙

St H&S

Have you ever experienced feeling numb and having completely frozen legs? We invented St H&S to help you. We are Fung Ching Lam, Cheung Hong Ching, Leung Hiu Lam and Pong Wing Yiu of PH22 from Wesley College.

The name refers to Steps to Health & Snacks, which is converting steps to health and delicious snacks. We target those who have to sit for extended periods of time, especially in a cool room. For instance, people who work from home, office workers, gamers etc. You can also introduce our product to the elderly at home so that they can stretch their legs when they are enjoying the TV programmes.

Using St H&S is easy. First, you put our product under your desk. Then, as you step on the pedals, the electricity generated opens your personal snack box, and you can enjoy some treats that you can personify.

But, what if you don't eat snacks? Don't worry, you can use the electricity generated to charge your phone or a humidifier or a perfume atomizer etc. The two appliances mentioned above can relax you and shorten the distance between you and a healthy life.

In addition, we have an app that you can input your schedules and how much water you drank. Besides, it shows how much exercise you have done and the energy you've produced. Resulting in aiding you in reaching good health.

In conclusion, using St H&S can aid you in getting healthier and reduce your carbon footprint. Finally, you can protect the Earth.

你有因久坐而腳部不適的經驗嗎？我們PH22，來自衛理中學的馮靖琳、張康晴、梁曉琳及龐潁遙，設計了St H&S助你解決這個問題！

St H&S的全名是Steps to Health and Snacks，意思是把腳步轉為可口美味的零食和健康。我們的產品針對一些經常久坐並開空調的人士，例如辦公室工作者、在家工作者或電競選手，希望能減少對雙腿及身體的傷害，當然，即使是在家中看電視娛樂的老人家，也能多運動雙腳。

在產品應用方面，只要把產品放於桌下，在就坐時通過踩踏腳踏，伸展你的雙腳，以簡單伸展雙腳的方式便能發電從而打開你的個人零食盒，獲得你自定的「獎勵」。

你不喜歡吃零食？沒關係，你能運用你所產生的電力為你的電話或小型家電充電，例如為香芬機及加濕器充電。上述兩樣小型家器不但使你身心放鬆，更能使你與健康的身體之間的距離更短。

在使用過程中，我們推薦你配搭上我們的應用程式，查看你的運動量及電力產量。除此之外，應用程式內還帶有喝水量紀錄及日程表功能，助你更順利地邁向健康。

總括而言，使用本產品既能助你保持健康，又能減少自己所製造的碳足印，保護地球。

VegeCallento

Tsuen Wan Government Secondary School
荃灣官立中學
Fok Wai Chung 霍慧聰
Cheng Yi Nuo 程伊諾
Leung Ko Yan 梁高欣
Hu Sze Wai 許思蔚

Our model Vegecallento takes inspiration from vegetables and calligraphy. Researches has shown that practicing calligraphy helps improve mental wellness since it requires people to focus solely on their strokes to write well. Besides, vegetable scraps are produced everyday in Hong Kong households and hence could be obtained easily. Therefore, the two seemingly unrelated nouns are linked together by means of constructing an ink machine and a paper making machine using vegetables as the raw material in the hope of slowing down the hectic lifestyle of Hong Kongers. We hope through enabling people to practice calligraphy with tools produced from the handy materials in the household would restore their disrupted rhythm of life.

First and foremost, our ink machine is a modified blender which allows users to produce their own ink for practicing calligraphy from vegetable scraps at home with ease. The natural pigments in vegetable scraps are extracted by crushing them which destroys the cellulose cell wall, cell membrane and vacuolar membrane. The pigments would then be processed to become more resistant to colour changes due to oxidation and moulding.

Secondly, our paper making machine consists of two parts, namely the water trough and storage spaces for paper pulp. The paper pulp will be prepared using the modified blender from office paper and fibrous vegetable scraps. While there is a water pump in the water trough which circulates water in it to ensure the even distribution in the mould and deckle so as to produce smoother paper.

Vegecallento 的靈感來源自書法以及蔬菜。有研究表明，練習書法的過程可提升人們的專注力以及得到成就感，從而改善都市人的心理健康。此外，普遍家庭每天都會剩下吃不完的食物，大大加重了堆填區的負擔。我們結合練習書法的益處以及蔬菜廚餘過剩的狀況，分別構建了墨水機和造紙機。我們希望通過讓人們使用家中隨手可得的廢棄材料所製作的工具來練習書法，藉此減緩香港人繁忙急促的生活步伐，恢復他們本應擁有的悠然生活節奏。

首先，我們的墨水機是一台被改裝過的攪拌機，使用者可放入家中剩餘的蔬菜殘渣，製成書法用的墨水。透過攪拌機刀片的飛速轉動，蔬菜殘渣中的纖維素細胞壁、細胞膜和液泡膜會被粉碎及破壞掉，從而提取當中的天然顏料。然後，這些顏料會被加工處理，如添加適量的鹽、糖或食用醋，使其更耐色變和防霉。

其次，我們的造紙機由水槽和存放紙漿的空間所組成。使用者可利用墨水機攪碎廢紙及蔬菜纖維來做出稠糊的紙漿。將其倒入水槽中，再多次按壓水泵，便可令紙漿在模具上來回滑動，緩慢過濾紙漿，以確保紙糊均勻分佈，從而製造更平滑的紙張。

STRUCTURE
架構

EXECETIVE COMMITTEE

執行委員

From left to right:
Anson Yiu, Ronald Tang, Emma Leung, Hayley Lau, Nicole Chung, Hugo Cheung, Linus Choi, Joycelyn Chow, Ennis Yip, Natalie Cheng

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2nd row: Veronica Lam, Sherman Ma, Yoyo Leung, Chloe Choi, Elvis Kwok, Pius Leung, Josh Mak
1st row: Hayley Lau, Natalie Cheng

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Treasurer: Natalie Cheng
Vice Directors: Elvis Kwok, Pius Leung
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Officals:

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Coco Chan
Candy Chau
Donna Wong
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Hebe Wong
Isabelle Ho
Johnny Chan
Jeremy Lee
Kwok Ka Ling
Marco Li
Parco Ho
Simon Po

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Vice Directors:
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Moon Huang
Poon Yi Hang
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Tiffany Chan
Tsang Yi Tung
Wong Cherrie
Wu Wing Ki
Yim Wing Hang
Yeung Man Yui
Zhou Cheuk Yin
Zhou Wai Lam

3rd row: Cecilia Guo, Moon Huang, Angela Man, Chan Ka Yiu, Angel Zhang, Wu Wing Ki, Cherrie Wong
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Debbie Chow
Justine Tang
Kelvin Ma
Krystal Wang
Melody Huang
Sukey Wong
Terrance Cao
Tiffany Wong
Winnie Lok
Yuki Lee

3rd row: Ashley Zeng, Krystal Wang, Thomas Yiu, Ivana Tang, Tiffany Wang, Melody Huang
2nd row: Justine Tang, Ashley Ng, Bobo Ki, Angela Tsui, Debbie Chow, Kelvin Ma
1st row: Anson Yiu, Ennis Yip

PAST EVENTS
活動回顧

PROPOSAL COMPETITION

計劃書設計比賽

The Proposal Competition took place from January to March 2023. 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 56th J.S.S.E..

計劃書設計比賽於二零二三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，並於第五十六屆聯校科學展覽展出其作品。

PREPARATION COMMITTEE GATHERING

籌備委員會聚會

The Preparation Committee Gathering was successfully held on 23 December 2022 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 certainly helps strengthen the bonding and deepen the understanding between our members.

籌備委員會聚會於二零二三年十二月二十三日在石澳舉行。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。

PROJECT HOLDERS' SEMINAR

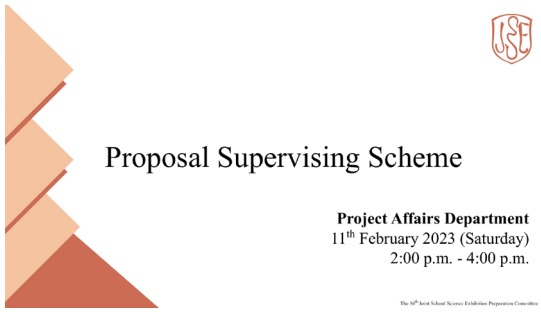
展品負責人研討會

The Project Holders' Seminar was successfully held on 28 January 2023 in the Hong Kong Science Museum. During the seminar, the J.S.S.E.P.C. and J.S.S.E. were introduced to the Project Holders from different participating schools. Details of the Proposal Competition such as regulations, marking criteria as well as guidance on the preparation work were also announced.

展品負責人研討會於二零二三年一月二十八日在香港科學館舉行。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，研討會中亦公布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

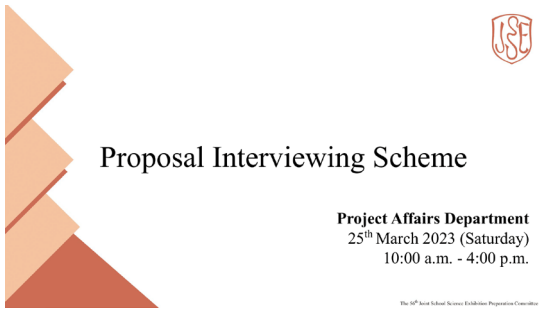


The Proposal Supervising Scheme was successfully held in February 2023 in the Hong Kong Science Museum. A panel of supervisors consisting of numerous professors and lecturers from renowned local tertiary institutions met the Project Holders in person a few wells before the deadline for submission of 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.

計劃書指導計劃於二零二三年二月下旬舉行。由教授和大學講師組成的指導人員於提交計劃書截止日期數星期與展品負責人會面，並解答他們在制定計劃書時遇到的難題及疑問，藉此給予建議，藉以提高其計劃書水平。

PROPOSAL INTERVIEWING SCHEME

計劃書面試計劃

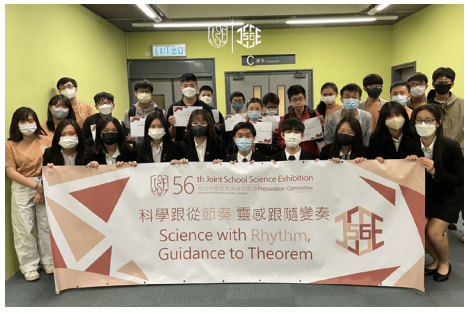


Project Holders were interviewed by adjudicators in March 2023. During the interview session, Project Holders were required to give a presentation on their proposals and to answer questions raised by the adjudicators. This offers the adjudicators an indepth understanding of their proposals, ensuring objectiveness on the results of the Proposal Competition as well as the selection of teams for the 56th J.S.S.E.. Only those whose scores exceed a certain standard could be able to exhibit their products in the Exhibition.

展品負責人於二零二三年三月下旬與評判會面。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。再計劃書面試計劃中得分超過一定標準者，方能得到參加第五十六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 5 March 2023 at the Science Museum. We are delighted to see participants from different schools getting along to complete the fascinating science-based experiments and games in the activity

初中學生活動順利在二零二三年三月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及遊戲，獲益良多。

PROJECT HOLDERS' ORIENTATION CAMP

展品負責人迎新營

The Project Holders' Orientation Camp was successfully held from 7 to 9 April, at Wu Kai Sha Youth Village. Project Holders were grouped into teams and completed a series of tasks related to the preparation of the Exhibition, such as a mock Model Inspection Scheme and a mock Exhibition. Moreover, campsite tracing and some detective games were organised for them to build teamwork and have some fun. They not only got a taste of the real exhibition, friendships were also developed among each other.

展品負責人交流營順利在二零二三年四月七日至四月九日於烏溪沙青年新村舉行。展品負責人會組成不同小隊完成一系列有關展覽的任務，例如模擬展品視察計劃及模擬科學展覽。此外，展品負責人也參與了一系列的營地追蹤遊戲及偵探遊戲，在歡樂中體驗團隊精神。他們不但能親嘗八月的聯校科學展覽，也能藉此與不同展品負責人及與籌備委員會會員培養深厚的友誼。

PRIMARY SCHOOL SCIENCE WORKSHOP

小學生科學工作坊

The Primary School Science Workshop was successfully held on 21 May 2023 at Hong Kong Science Museum. We are delighted to see all participants actively engaged in the activity, spent time together and developed their interests towards science.

小學科學工作坊在二零二三年五月二十一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，一同沉醉在奇妙有趣的科學世界裏。

FUNDRAISING ACTIVITY — Découvrir

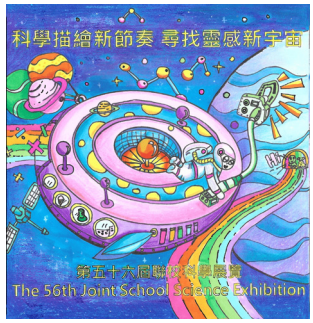
年度籌款活動—Découvrir

Our Fundraising Activity—Découvrir was successfully held on 22 June 2023. We are delighted to witness the devotion of all participants in the game. They demonstrated excellent team spirit by working collectively to complete the challenging tasks and search for the ultimate prize.

本年度籌款活動—Découvrir 於二零二三年六月二十二日舉行。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尋找最終寶物。

PRIMARY SCHOOL COLOURING COMPETITION

小學生填色比賽



Junior Divion Champion
初小組（小一至小三）冠軍

Senior Divion Champion
高小組（小四至小六）冠軍

Based on our annual theme “Rhythm”, 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 With Rhythm, Guidance to Theorem“.

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「節奏」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「科學描繪新節奏，尋找靈感新宇宙」。

ALUMNI GATHERING

歷屆籌委聚會

The Alumni Gathering was successfully held on 16 July 2023. In the gathering, the bonding between the alumni and the members of the 56th J.S.S.E.P.C. has been further developed.

歷屆籌委聚會在二零二三年七月十六日順利舉行。歷屆籌委及現屆籌委在此聚會中建立了深厚的聯繫。

ANNUAL BALL — Inesquecível

年度舞會——Inesquecível

The Annual Ball—Inesquecível was successfully held on 1 August 2023. Brilliant performances were given by singer 'Mansonvibes', 'Scarlett Chung' and dance group 'METEOR'. Everyone has had a wonderful and romantic night revelling in moments of rejoice and laughter.

年度舞會——Inesquecível 於二零二三年八月一日成功舉辦。歌手"Mansonvibes" 和"Scarlett Chung"及舞團"METEOR"帶來了精彩的表演。每個人都陶醉在歡樂和浪漫的時刻，度過了一個美妙的夜晚。

ACKNOWLEDGEMENT

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The 56th Joint School Science Exhibition Preparation Committee

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Hong Kong Science Museum

Associated Organisation
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創新科技署
Innovation and Technology Commission

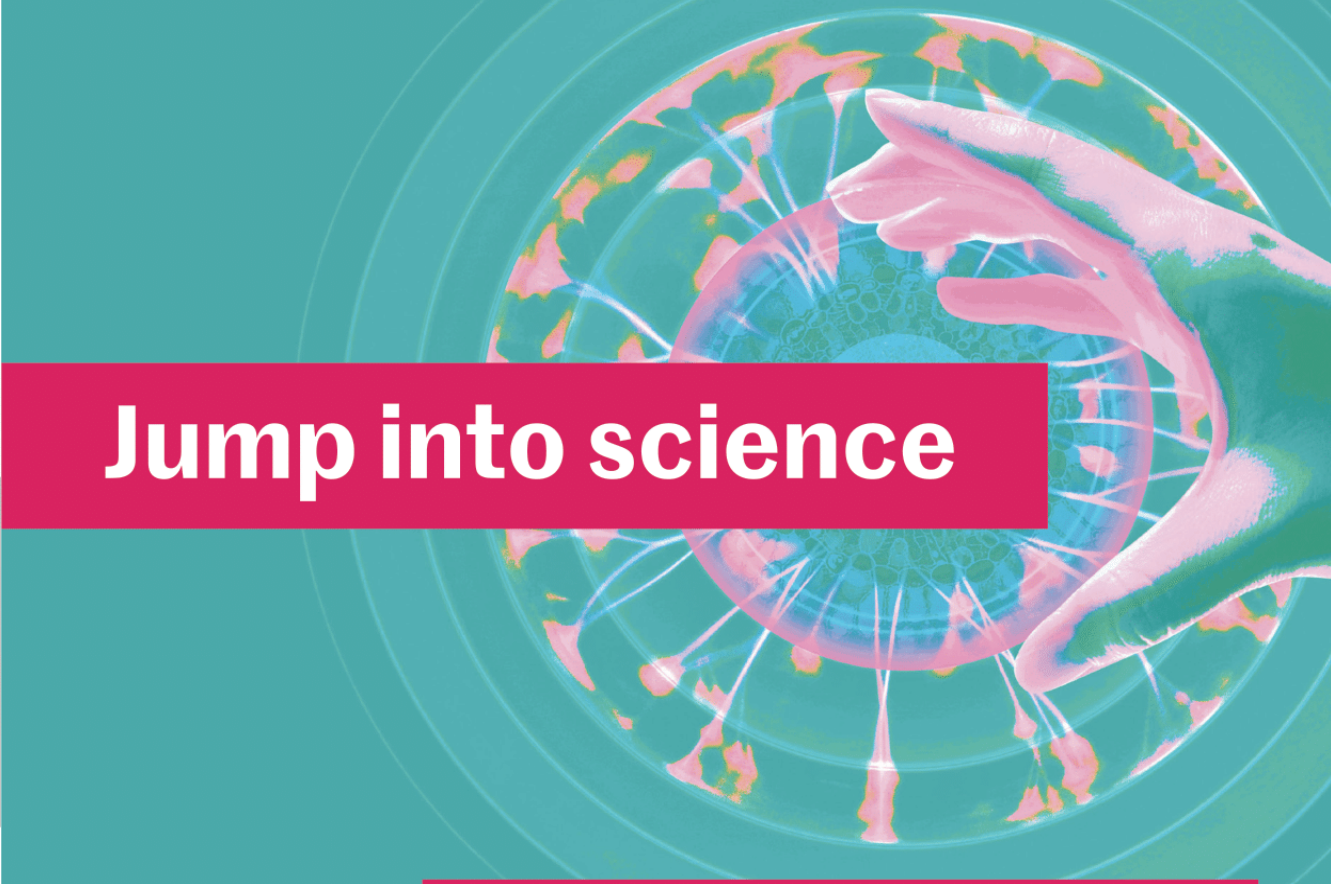
創新科技署

香港特區政府創新科技署於 2000 年成立，肩負引領香港成為以知識為本的世界級經濟體的使命。創新科技署的工作重點包括提供基礎為本的世界級經濟體的使命。創新科技署的工作重點包括提供基礎設施，發展人力資源；資助應用研發、支援創科企業；提倡創科文化， 設施，發展人力資源；資助應用研發、支援創科企業；提倡創科文化， 以及支援檢測和認證業的發展等。

Innovation and Technology Commission

Established in 2000, the Innovation and Technology Commission (ITC) of the HKSAR Government has been charged with the mission of spearheading Hong Kong's drive to become a world-class, knowledge-based economy. The ITC strives to enhance Hong Kong's competitiveness through providing infrastructure and developing human capital, funding applied research and development, supporting I&T ventures, fostering an I&T culture and supporting the development of Hong Kong's testing and certification industry.

CROUCHER 科學周
SCIENCE WEEK



Jump into science

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 **www.croucherscienceweek.hk**

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城市大學教授及其科研團隊為圖像處理及壓縮科技研究之先驅，於1994年創辦"千里眼集團"，把其科研成果進一步發展出創新的遠程視像監控系統。系統的先進功能廣泛地應用於各行業的保安及遙距管理項目上，產品出口至五十多個國家。"千里眼集團"於2001年成功上市，為第一間由本地大學科研成果發展出來的上市公司。

鑒於科技發展一日千里，並對各地社會及文化影響深遠，為此，始創人籌集資金並創立"千里眼始創人慈善基金有限公司"，以推動、促進與普及科技教育。

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