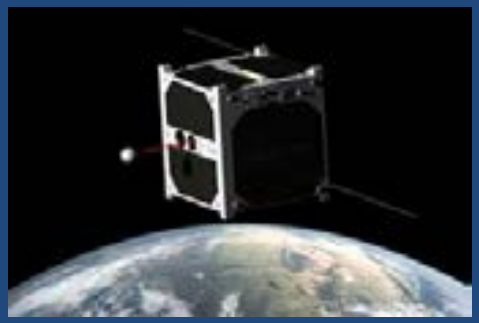
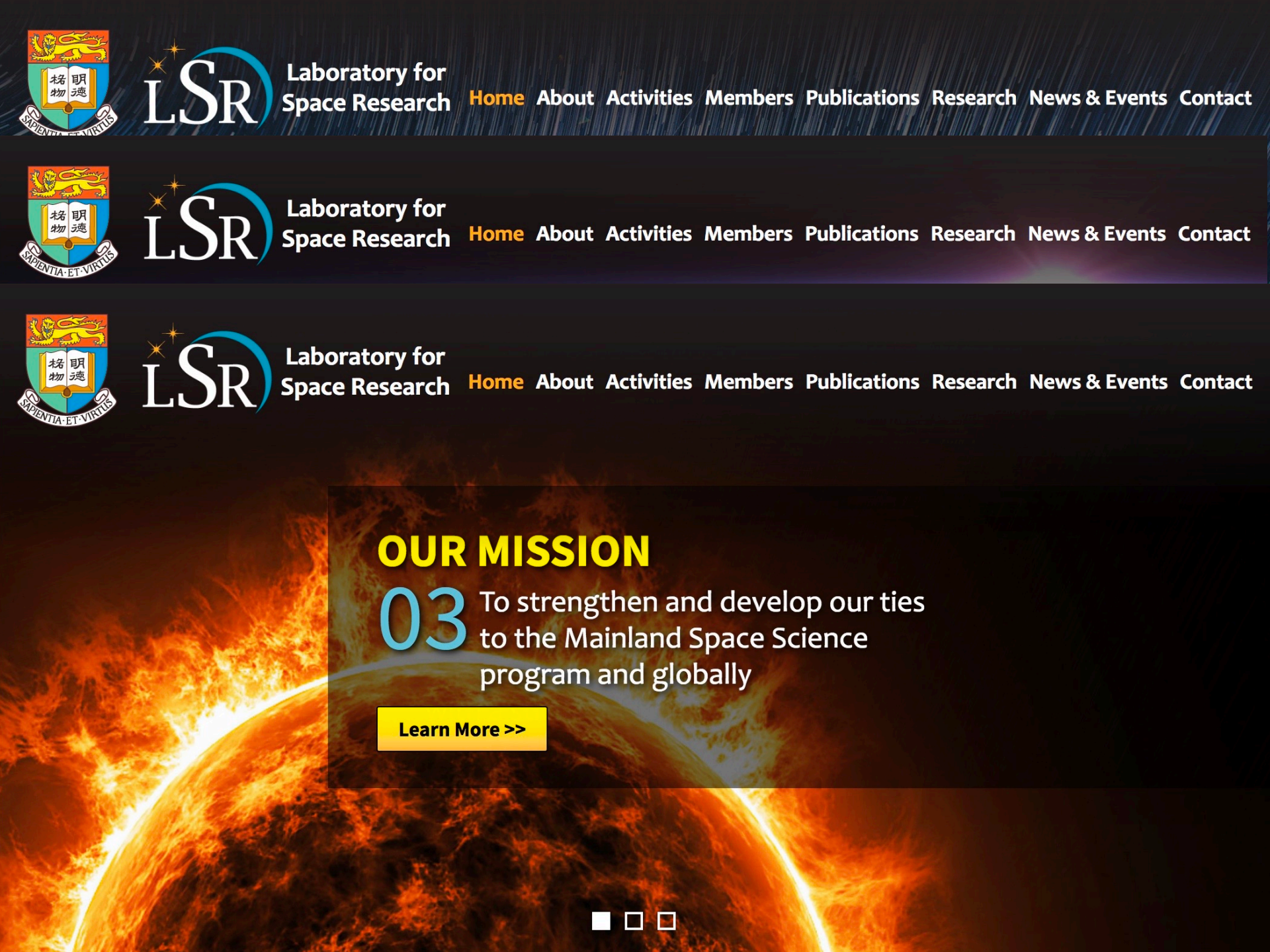
The HKU Laboratory for Space Research:
The BEST partner for the "BEST" program

Prof. Quentin A Parker,
Director LSR
The University of Hong Kong

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OUR MISSION
03
To strengthen and develop our ties to the Mainland Space Science program and globally
Learn More >>

LSR Laboratory for Space Research

SAPIENTIA·ET·VIRTUS

HONG KONG

ASES 上海埃依斯航天科技有限公司

CASC 中国航天 北京空间机电研究所 Beijing Institute of Space Mechanics & Electricity

PEKING UNIVERSITY 1898

NANJING UNIVERSITY 1902

ZHEJIANG UNIVERSITY 1897

UNIVERSITAS STUDII PADUANI MCCXXII

SAPIENTIA·ET·VIRTUS

CASC

James Clerk Maxwell Telescope East Asian Observatory

MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

NAOC

CSU CENTER FOR SPACE UTILIZATION · CAS

CHINESE ACADEMY OF SCIENCES

DFH Satellite

SUN YAT-SEN UNIVERSITY

东莞 CHINA Dongguan 每天绽放新精彩

中核集团 CNNC

NATURAL HISTORY MUSEUM

The Business Economy for Space Technology (BEST) Programme.

- First of its kind Space Technology initiative in Hong Kong
- A new, guided, STEM-based, hands-on, immersive, interdisciplinary Educational experience with a strong entrepreneurial edge!
- Students can unfold the unlimited boundaries of the "*NewSpace*" and explore how a CubeSat can help provide solutions to global issues

NewSpace is a term coined to refer to the recent commercialization of the space sector

Watch the Video! An all star cast ☺

https://www.youtube.com/watch?v=4MxIao3Usuw

Check the website: https://cubesat.hku.hk/

BEST Program Schedule

2 semesters

September-February

Structure & Delivery (across 14 hours)

Three 2-hour webinar-based workshops in September & October 2021 (6 hours) and four 2-hour workshops in January & February 2022 (8 hours) across a total of 14 hours of scheduled materials. This will of course be supplemented by as much additional teamwork effort and application as each School team decides to invest to deliver their contribution. It is open-ended but should be set within an overall reasonable enveloped of extra-curricular activity as decided by the Teacher and team.

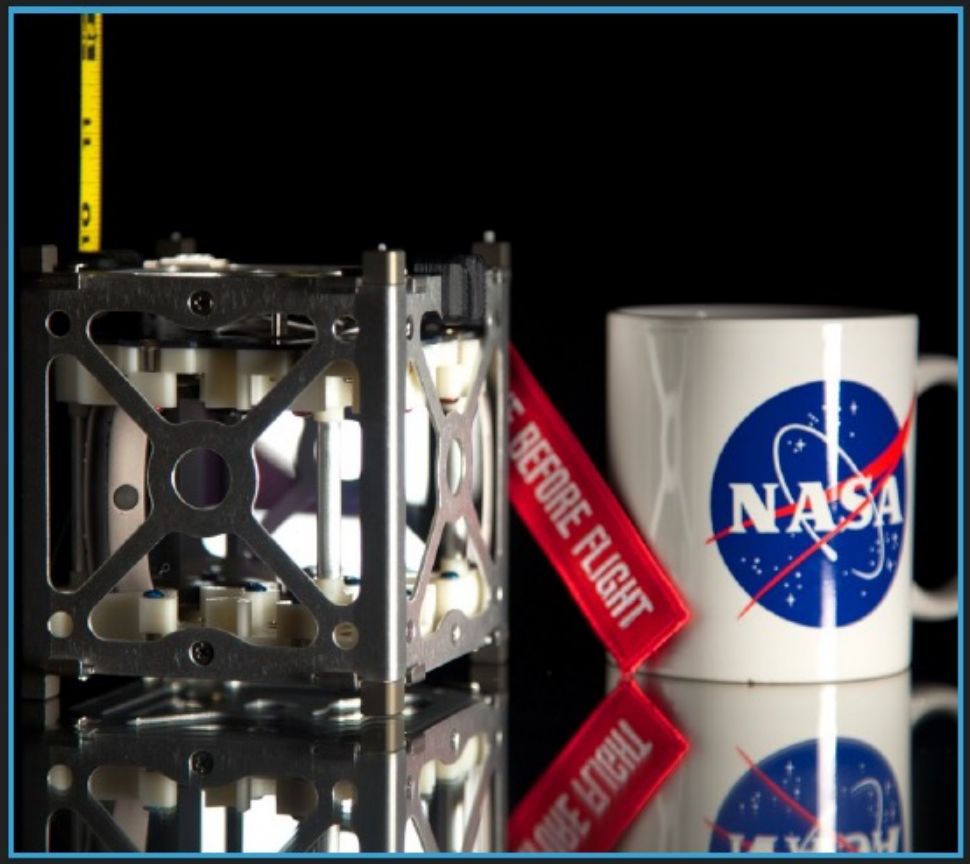
Focus and program split:

There is a ~70-75% focus on STEM (~9hrs) and a ~25-30% focus on Entrepreneurship and related matters (~4hrs). The BEST program consists of 7x2 hour taught "episodes" including 1.5-2 hours for school team project presentations together with as much time, energy and effort each school team is prepared to invest over the course of the program.

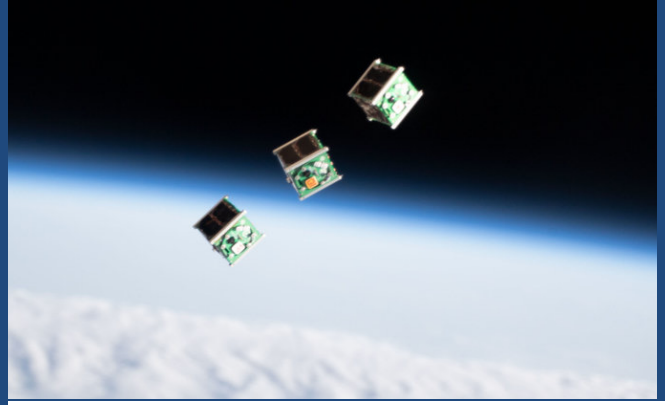
What is a CubeSat?

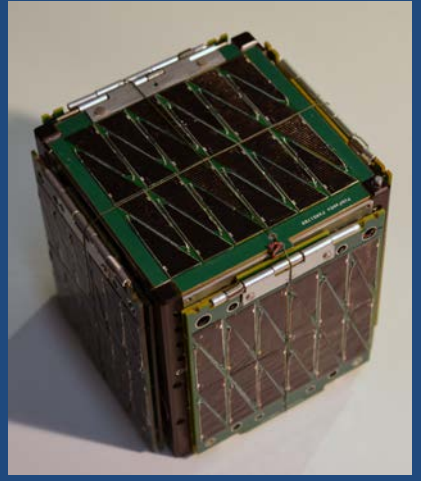
WHAT'S A CUBESAT?

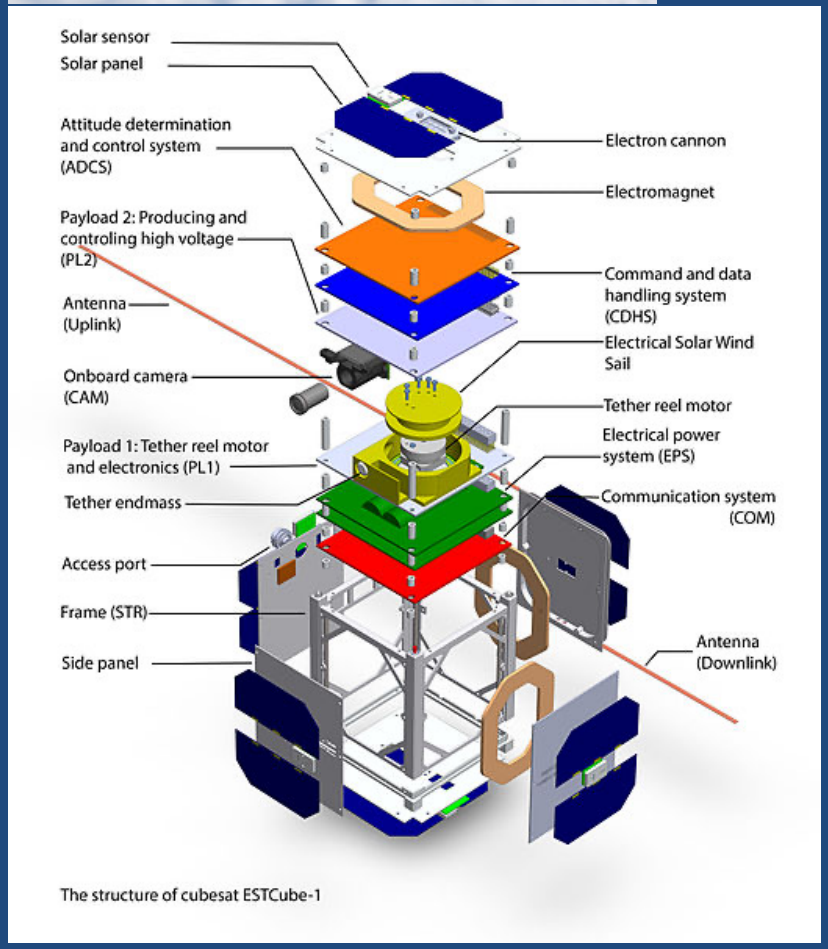
- A MINI-SATELLITE:
- IN A STANDARD 10x10x10cm CUBE
- MADE FROM COMMERCIAL OFF-THE-SHELF COMPONENTS
- ALLOWS FOR LOW COST & RAPID DEVELOPMENT COMPARED TO CONVENTIONAL SATELLITES
- FOLLOWS INTERNATIONAL CUBESAT DESIGN SPECIFICATION (cubesat.org)
- FOLLOWS ISO 17770:2017 SPACE SYSTEMS – CUBE SATELLITES (CUBESATS) (https://www.iso.org/standard/60496.html)



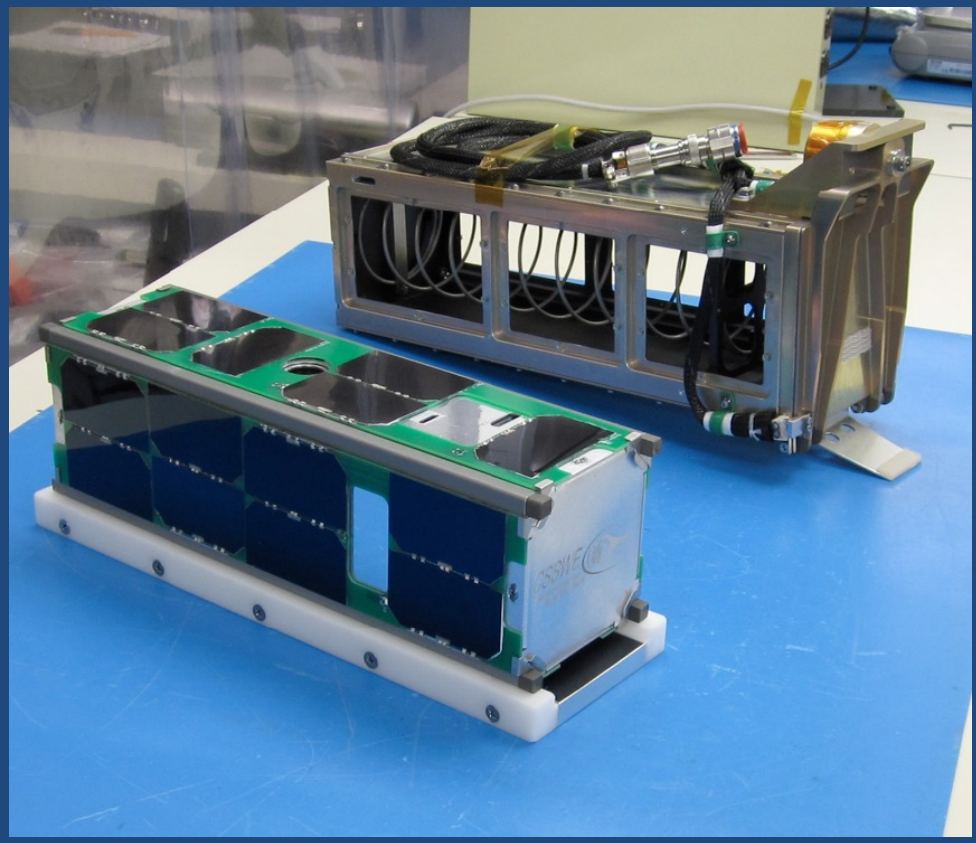
CUBESATS



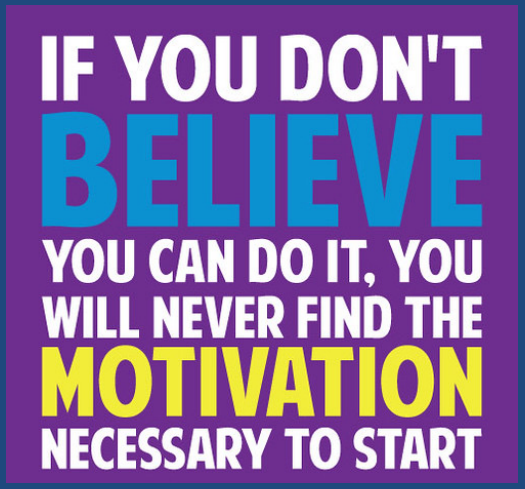




The structure of cubesat ESTCube-1



YOU CAN DO IT!



- Program scope tailored to age range 16-17years
- The levels of science, technology, computing, design, engineering and business “savvy” needed for BEST are not BEYOND the scope and understanding of this cohort!
- We have the staff and expertise to assist, advise, mentor and support across this exciting program
- Interdisciplinary Teams should be comprised of STEM students who focus on Science, Math's, Engineering, Computing, Design, Technology and even Business

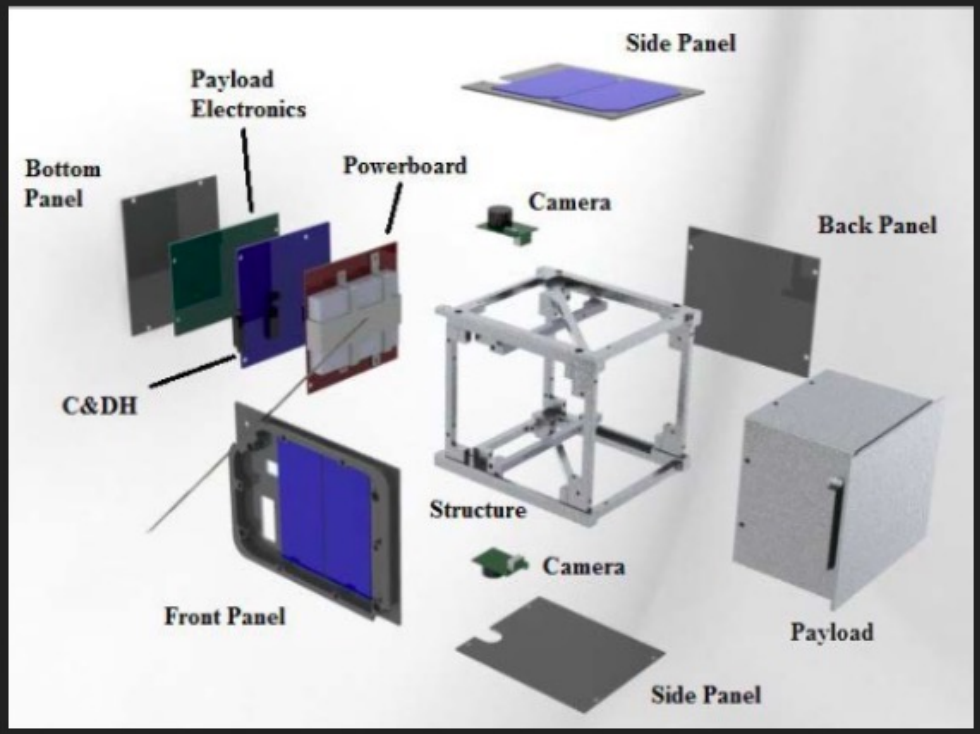
Students from Irvine College USA working on a CubeSat project

https://www.irvinestandard.com/2018/3-2-1-irvine-we-have-liftoff/

COTS – but not to sleep in!

WHAT'S INSIDE A CUBESAT?

- COMMAND & DATA HANDLING (C&DH) - CubeSat's "Brain"
- COMMUNICATIONS - Connects CubeSat to Receivers and Ground Station for data transfer
- POWER & ELECTRICAL - Solar panels & battery for electricity generation and storage
- SENSORS - Camera or other Remote Sensing Equipment
- STRUCTURE - Physical frame to hold Subsystems



COTS: Commercial "off the shelf" components

COTS and COSTS

- For many CubeSat missions COTS parts are the only viable option in meeting the cost and performance needs of a mission.
- The price and long lead-times of fully-qualified components is usually unaffordable.
- Many COTS devices are operating successfully *in-orbit* and in this BEST program COTS will form a vital aspect for any CubeSat concept developed
- Testing and Reliability remain key

BEST Support: Advisors, Mentors and experts – you are not alone!

WHAT ARE THEY?

- STUDENT TEAMS WILL HAVE OPPORTUNITIES TO CONSULT WITH ADVISOR EXPERTS SUCH AS ENGINEERS, ENTREPRENEURS, AS WELL AS UNIVERSITY STUDENT ADVISORS

BENEFITS

- ADVISORS ANSWER QUESTIONS AND GUIDE STUDENT TEAMS IN PROBLEM SOLVING
- VALUABLE ADULT INTERACTION OPPORTUNITIES FOR STUDENTS
- CONNECTIONS TO UNIVERSITY STUDENTS AND WORKING WORLD PROFESSIONALS EXPAND STUDENT HORIZONS
- THESE CONNECTIONS SUPPORT GROWTH OF NEWSPACE ECOSYSTEM

Schedule of the BEST program

"BEST" PROGRAM STRUCTURE

WORKSHOP WEBINARS (SEPT 2021- FEB 2022)

OASA & HKU-LSR JOINTLY PRESENT WORKSHOP WEBINARS ON CUBESAT DESIGN, BUILD, MISSION PLANNING, PROJECT MANAGEMENT, BUDGETING, MARKETING & FUNDING

PHASE 1: MISSION DESIGN (FALL 2021)

- STUDENT TEAMS (6-8 PERSONS) CONCEIVE CUBESAT MISSION AND SUBMIT PRESENTATION/VIDEO OF CUBESAT MISSION & DESIGN FOR VALIDATION AND JUDGING

PHASE 2: BUILD & DEPLOY CUBESAT PROTOTYPE (JAN-APRIL 2022)

- STUDENT TEAMS BUILD CUBESAT PROTOTYPE FROM COMMERCIAL OFF-THE-SHELF COMPONENTS, DEPLOY AND COLLECT DATA
- STUDENT TEAMS PRESENT RESULTS TO JUDGING PANEL; MOST COMPELLING MISSION PROPOSAL MAY BE AWARDED POSSIBILITY OF ACTUAL LAUNCH VIA HKU-LSR

Eligibility and How to Apply

APPLICATION DETAILS

ELIGIBILITY

All Secondary Schools in Hong Kong (**School-based Applications).**

APPLICATION

School Team(s) shall be formed under each school. Each school shall assign a **School Teacher** to be the school mentor and main contact person of this project.

Each team should ideally have around 6 to a maximum of 8 students. The school shall decide the composition of the team, including the number of students for each team, year of study. S.4 to S.5 students are the target groups for this programme. School-based Applications shall be submitted HERE by September 13, 2021.

HERE: https://hku.au1.qualtrics.com/jfe/form/SV_dpoPPQiTL8vEFuK

How much does it cost to join?

PARTICIPATION FEES

Participating school teams are not charged any fees to participate in the programme. However, each School Team will be responsible for its own costs and expenses, including for any equipment associated with designing, building and deploying a CubeSat Prototype, such as computers, ground stations, transportation, data storage, and any other hardware and software.

- Additional support may be available from the BEST consortium subject to reasonable justification

How will we evaluate Teams?

JUDGING CRITERIA

Each school based project will be monitored, mentored and advised every step of the way by teachers and relevant members of the consortium. Final projects will be judged by both members of the consortium and external independent judges when selecting the best projects for awards. The principal selection criteria are below but encapsulated within an overall holistic approach:

- Innovation
- Technical Feasibility
- The Project's Commercial and/or Scientific Potential
- Overall Team Performance
- Achieving the Sustainable Development Goals of United Nations
- Community Engagement

BEST is for V*I*C*T*O*R*Y

what students gain from participation

- Valuable Generic Skills
- Interesting Content
- Curriculum Relevant
- Teaching Enriched
- Objects Based Learning
- Real and Exciting
- Youth Focused

- Also team building skills, internship opportunities, fun interactions with top scientists and entrepreneurs, valuable knowledge, exposure to new ideas and technologies etc etc etc!

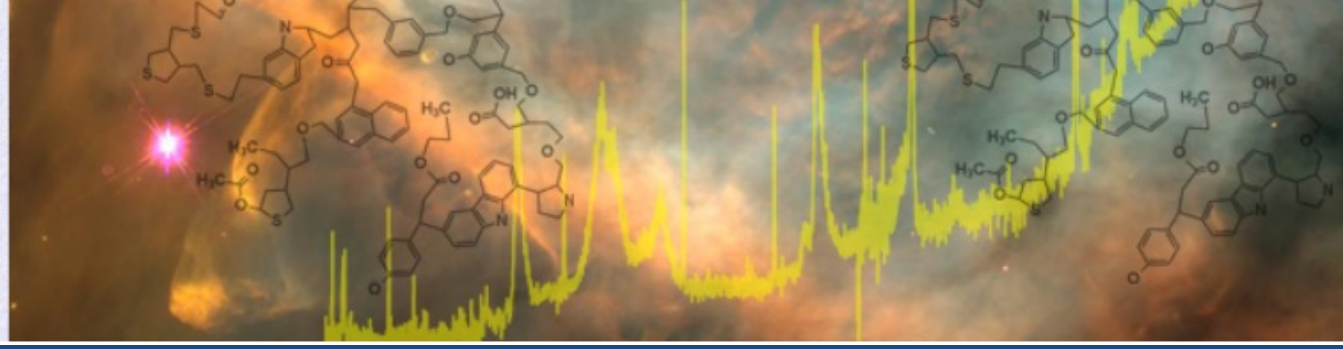
AWARDS & REWARDS

- Certificates of achievement (various levels)
- Prizes
- HKU Scholarships – Winning team can attend HKU summer programs organized by HKU Academy for the Talented.
- Internship opportunities at the LSR and OASA
- If the winning CubeSat concept is both viable and achievable it may form the basis of a REAL MISSION!

We encourage you to:

- ***B****ecome a space technology enthusiast;*
- ***E****xplore the future Space Ecosystem;*
- ***S****tretch your Imagination and*
- ***T****rain your mind*

*"to be the **BEST** it can be as you conceive, design and build your very own CubeSat prototype,"*



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非常感谢你

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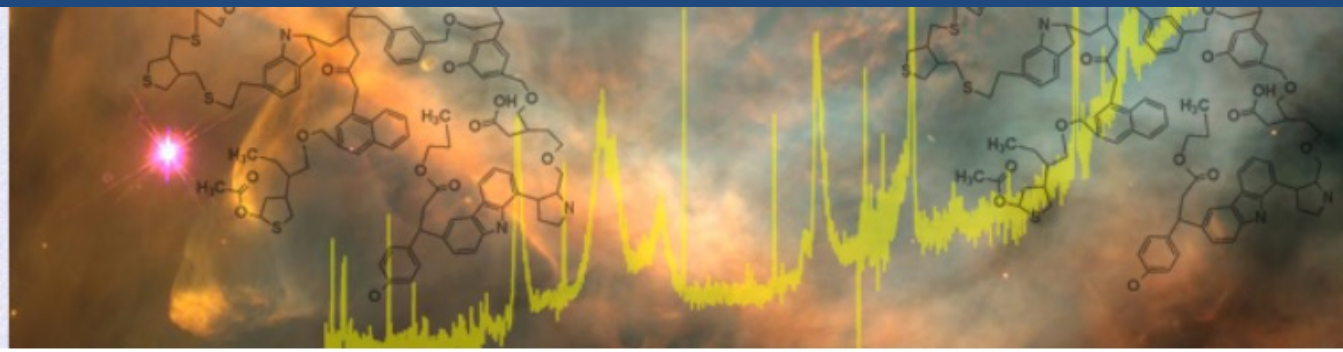
THANK YOU!



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