

# ENGAGE 程繫中大

Faculty of Engineering, The Chinese University of Hong Kong Issue 37, September 2021  
http://www.erg.cuhk.edu.hk   cuhkengineering



## CELEBRATING 30 YEARS OF CUHK ENGINEERING EXCELLENCE

2021 marks the 30<sup>th</sup> anniversary of the Faculty of Engineering at CUHK! The Faculty of Engineering was established in 1991 by Professor Sir Charles K. Kao, former Vice-Chancellor of CUHK and the Father of Fibre Optics. As we celebrate our past and imagine our future, we are now holding several signature events and projects in honor of the achievements of our faculty members, students and alumni.

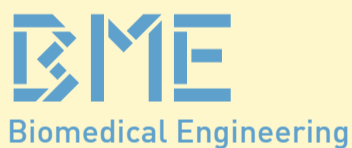
We design and build a Project Showcase Corridor consisting of several large video displays on the podium of Ho Sin Hang Engineering Building on University campus. The Corridor aims to showcase the latest research accomplishments from our engineering departments. It will include research project highlights and video demonstrations that will lead you to all the interesting and innovative aspects of CUHK Engineering research.

We also celebrate our commitment to inspire our people to greater heights. A series of distinguished lectures will be organized in the coming few months. We will also publish an anniversary booklet to tell more stories about our entrepreneurship and research excellence, and we will launch a website featuring our timeline of development. To connect with our alumni, we are going to join hands with our alumni association to stage a reunion event.

Our anniversary celebration is a great opportunity to honor those who have contributed to making impacts through engineering and technology, and to imagine what we can accomplish together in the future. Please join us to celebrate our 30<sup>th</sup> anniversary!

Martin D. F. WONG  
Dean of Engineering

## SHARING FROM ALUMNI



### WONG Siu Yee Suye

2014 BEng (Biomedical Engineering) graduate  
Engineer/Health Sector/Hong Kong East, Electrical and Mechanical Services Department (EMSD), HKSAR Government

I take great pleasure in congratulating the Faculty of Engineering on its 30<sup>th</sup> anniversary celebration. 30 years is considered a generation. The Faculty of Engineering has been a cradle of talents. I still

feel the great bonding with my Alma Mater whenever I receive trainees from CUHK.

I keenly look forward to the continuous achievements of the Faculty in the decades to come.

### HEUNG Ho Lam Kelvin

2016 BEng and 2020 PhD (Biomedical Engineering) graduate  
Chief Technology Officer, Hopebotics Limited

It has been eight years since my first lecture in CUHK. Studying at CUHK allowed me to meet a lot of new friends in the past during the courses and activities. I really enjoyed and missed the time of my undergraduate and postgraduate studies at the university. The Faculty of Engineering also offered lots of learning opportunities for me to utilize what I have learned from the courses in real engineering designs. I believe more talents would be attracted by the unique culture of CUHK and joining this big family.



### SUNG Man Ling Sammi

2016 BEng (Computer Engineering) graduate  
Scientist, Raytheon BBN Technologies

I'm currently working as a staff scientist in Raytheon BBN Technologies, located in Boston, USA, doing latest speech technology research.

During my bachelor study in the Computer Engineering programme, I am grateful to have the opportunity study with the world most talented students, through the MIT-CUHK Undergraduate Exchange Programme. The experience has widened my horizon culture-wise and academic-wise.

I had my M.Phil study in the Department of Electronic Engineering. DSP lab is a place with great people, where we had coffee, conversations and meaningful research projects. Prof. Lee Tan has also been supportive not just on my research, but also my personal development and career, and introduced me to the current job.

CUHK has provided many opportunities to students, e.g. Robocon, GLOBEX Summer Exchange Programme, various programming workshops and competitions, which are all chances for me to have hands-on engineering experiences and connect with people around the world. I believe the Engineering Faculty will continue to be a great place to equip and support students. Happy 30<sup>th</sup> anniversary!



### SIT King Lok Forte

2014 BSc and 2018 MSc (Computer Science) graduate  
IT Coordinator, Department of Computer Science  
SRE Engineer, Mobility Technologies

In the previous 30 years, CUHK Engineering Faculty successfully connected professionals working on various fields in engineering around the world. I am proud to witness the blossom of the faculty. It is my great pleasure to share the delight of the Engineering Faculty 30<sup>th</sup> anniversary!

When I was a Computer Science undergraduate student, most of my classmates aimed to work as a web / mobile app developer after graduated. Students like me who have more interests in lower layer system, networking, security, and other fields are minority. However, since engineering students were allowed to choose most of the courses, including postgraduate courses, provided by the Faculty of Engineering, I had the opportunity to develop the area of my interest, and this made my dream of working as an SRE engineer in Japan come true. Currently, I am working on projects such as development and infrastructure design of a new payment system, as well as providing infrastructure support on a common scalable deployment platform where all applications of our company run on.

I highly appreciate the diversity cultivated by the faculty. It is exciting to see the brilliant futures of CUHK Faculty of Engineering!





Electronic Engineering

### FOK Mei Po Mable

2002 BEng, 2004 MPhil, 2007 PhD (Electronic Engineering) graduate  
Associate Professor, University of Georgia

Happy birthday Faculty of Engineering! Thank you for preparing me for my career in Photonics. After receiving degrees from the Department of Electronic Engineering, I joined Princeton University as a Postdoctoral Research Associate and later became a Faculty at the University of Georgia. Currently, I am an Associate Professor of the College of Engineering working on bio-/neural-inspired photonics and soft robotics research. It is always fun to work on interdisciplinary areas that uses my photonic knowledge to create something brand new.



Information Engineering

### AU YEUNG Ching Man Albert

2004 BEng (Information Engineering) graduate  
AI Engineer, LinkedIn

My heartiest congratulations to the Faculty of Engineering on its 30<sup>th</sup> anniversary! I was fortunate to have received education from both IE and CSE, where I was guided and inspired in the learning process by many devoted teachers. While university life to me seems so distant in the past now, experience as an engineering student at CUHK has always had its influence on my career and my life. I came to understand that problem solving skills, innovation and creativity are the core elements at the heart of technological advancement. I wish current students and alumni will be able to apply what they have learnt and continue to make this world a better place for all.



### TSANG Wai Wah Martin

2005 BEng (Electronic Engineering) graduate  
CEO and Founder, HALO Energy Limited

As a graduate of 2005, I would like to take this opportunity to express my gratitude to the Department of Electronic Engineering and the professors for providing a great learning environment equipped with sound resources and professional guidance throughout my academic career. All these have inspired my potential, provided me with a solid foundation, and broadened my horizon to become one of the few EV charging experts with 12 years of experience in Hong Kong, China and international markets. My academic result in first 2 years in EE was barely satisfactory. I was inspired and delighted my interest on electronic engineering from the one-year internship program in the 3<sup>rd</sup> year. Getting Dean list as well as Champion of the faculty final year project competition motivated me on running a startup on technology. I started EV Power in 2010 and developed the first universal electric vehicle charger and charging network system in Hong Kong. By 2014, the business expanded to China. In the spirit of a Hong Kong entrepreneur, I launched a new E-mobility business, HALO Energy Limited, based in Hong Kong in early 2021, dedicated to solving the EV charging problem, support our partner on decarbonization and readiness on E-mobility. Today, I can be proud of this achievement and once again thank the professors for their contributions over the years. Finally, I wish the Engineering Faculty to continue to shine in the next 30 years!



### LIU Yihan

2016 BSc (Mathematics and Information Engineering) graduate  
MBA candidate at UC Berkeley, Haas School of Business

I am very grateful about my journey with the Faculty of Engineering during my study of the MIEG programme. Here I met my lifelong friends who share my enthusiasm and passion about technology, engineering and mathematics; and the most inspiring professors who impart knowledge and life wisdom to the students. This experience led me to be a person who always challenge the status quo and be creative in the workplace. More importantly, I built a wider perspective about the engineering world and this still guides me on my career decision.

Happy 30<sup>th</sup> Anniversary to the Faculty of Engineering!  
Congratulations on reaching this milestone!



Mechanical and Automation Engineering

### LEONG Hou Wang

2015 BEng (Mechanical and Automation Engineering) graduate  
VAVE Mechanical Engineer, Beckman Coulter Biomedical GmbH

Seeking opportunities outside Hong Kong, I moved to Germany and worked as a mechanical engineer in 2018. Eventually, I joined Beckman Coulter Biomedical GmbH in Munich as a VAVE mechanical engineer. Beckman Coulter is international cooperation focusing on automating and simplifying biomedical testing. My job involves improving the competitiveness of the diagnostics automation products by reducing cost in mechanical engineering means.

MAEG programme has provided me the necessary knowledge and opportunities of gaining engineering experience through trial and error, to start my mechanical engineering design career. The friendliness and support of the professors, not only from the MAE Department but throughout the Engineering Faculty, have been in my memory in CUHK which I always feel grateful for.

There are quite some amount opportunities in the CUHK Engineering Faculty for students to improve and to gain, knowledge-wise and career-wise. It is recommended to try those out to gain precious experience. Combining with knowledge learned from the programme, it will become a great headstart and foundation to set sail for one's career goal.



Systems Engineering and Engineering Management

### NG Hin Kwong Benson

1996 BEng (Systems Engineering and Engineering Management) graduate  
Hong Kong Business Consulting Leader, EY

What will 4 years engineering discipline training and 3am meetings with insomnia professor lead to? A 23 years journey of consulting, a quest to figure out how systems work and what make them better.



### ZHANG Huanan

2012 BEng (Systems Engineering and Engineering Management) graduate  
Assistant Professor, University of Colorado Boulder

The four-year study in SEEM was a wonderful journey for me. I gain a solid foundation for my career development.

I was also very fortunate to receive the Professor Charles K. Kao Research Exchange Scholarship to do undergraduate research at Stanford. I hope CUHK Engineering continues to be the home for the next-generation engineers, scholars, and entrepreneurs in the next 30 years.



### DAI Ruoli Tristan

2007 PhD & 2004 MPhil (Automation and Computer-Aided Engineering) graduate  
Co-founder and Chief Technology Officer, Noitom Limited

I pursued my degrees in MAE Department (ACAE previously) at CUHK almost 20 years ago. I once took a class on neuron network, pattern recognition and optimization by chance. At that time, these classes were simply mundane pure math to me; and I never expected that 20 years later, this area would become the popularly known "Artificial Intelligence". It has become a hero concept in many different industries, bringing revolution to people's daily life. So, work hard and treasure every step of your learning!





## CUHK Robotics Team Wins Again in Robocon Hong Kong Contest

The robotics team of the Faculty of Engineering has been crowned Champion in the Robocon 2021 Hong Kong contest. The team can once again represent Hong Kong to win glory, after its success in the 2019 Asia-Pacific Robocon Contest. The 2021 Hong Kong

competition was held on June 20 at the Hong Kong Science Park. There were 13 student teams from 7 higher institutions. Two CUHK teams, Silver Strike and The Invincible, joined the game.

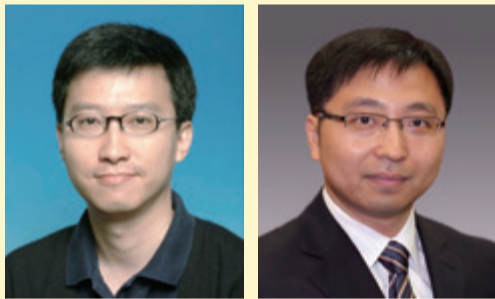
"Throwing Arrows in the Pot", inspired by ancient archery in China, is the theme of this year's competition. Each team is required to design a Throwing Robot (TR) and a Defence Robot (DR) to compete with the opposing teams. TR is controlled to throw arrows into the pots that belong to them, while the DR is responsible for spinning tables that hold the pots to prevent the opponent from scoring.

In the final game, Silver Strike competed against The Hong Kong University of Science and Technology (HKUST), and both were crowned co-champion by the organiser. Silver Strike also won the Best Performance and the Best Team Spirit Award. The ABU Asia-Pacific Robot Contest 2021 will be held in Qingdao, China.



## Engineering Professors Named RGC Senior Research Fellow and RGC Research Fellow

The Research Grants Council (RGC) has announced its funding results for the RGC Senior Research Fellow Scheme (SRFS) and RGC Research Fellow Scheme (RFS) of the 2021/22 Exercise. Two Faculty members received the awards. Each awardee is being supported with a fellowship grant to cover salary costs for relief teachers and support for research projects, to facilitate their dedication to research.



### RGC Senior Research Fellow and his project

Prof. LUI John Chi-sing (Computer Science and Engineering):  
Online Learning Theory Approach to Design Quantum Communication Networks

### RGC Research Fellow and his project

Prof. ZHANG Li (Mechanical and Automation Engineering):  
Medical Microrobotics for Endoluminal Procedures



## 2021 Kyoto Prize Laureate

Prof. YAO Chi-Chih Andrew, Distinguished Professor-at-large of the CUHK, world renowned computer scientist, has recently been selected 2021 Kyoto Prize Laureate, in recognition of his pioneering contributions to computation and communication.

Prof. YAO introduced the concept of communication complexity, a measure of the difficulty of a computational problem in terms of the communication load and provided a novel method for its analysis. These works provided a theoretical foundation for many important models such as circuit complexity, parallel and distributed computing, data structures and stream computing. Subsequently, his research has evolved into theories that consider the security and privacy of communications.

## 2022 Claude E. Shannon Award

Prof. YEUNG Wai-Ho Raymond, Choh-Ming Li Professor of Information Engineering, and Co-Director of the Institute of Network Coding, The Chinese University of Hong Kong (CUHK) has been named the recipient of the 2022 Claude E. Shannon Award by the IEEE Information Theory Society for consistent and profound contributions to the field of information theory. This award is the highest honour in the field.



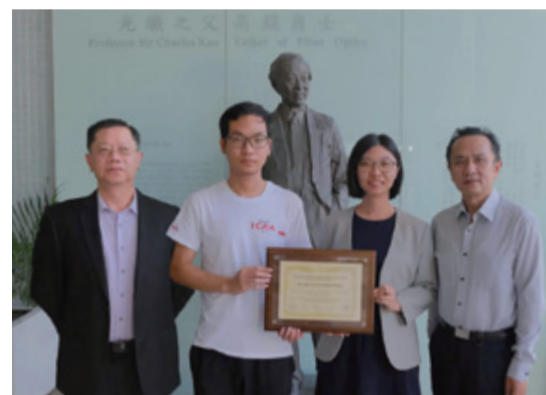
## BME Undergraduate Students Award in an Innovation Competition

A team of undergraduate students, NG Wing Fai Sofie, YU Ching Yi Amber, LI Tsz Ching Sharon, LAU Telly, CHAN Wing Huen Victor, from the Department of Biomedical Engineering has awarded "Potential Development Design Award (Tertiary Education Group) 具開發潛力設計獎 [大專組]" in the 2<sup>nd</sup> Biomedical Engineering Innovation Competition held by Youth Mechanic Association of Hong Kong (YMHK).



The team has designed a piece of music stretching mat for elderly to play around (Product Name: 咁踏樂). They uphold the spirit of interdisciplinary learning through STEM when designing this product, such as using Arduino for the coding, using circuits and resistors for the building elements of the product. The product allows elders to stretch their hands and legs at home, and it can train the response of users to prevent them from cognitive diseases.

## CUHK Engineering Research Team Wins IEEE ICRA 2021 Best Paper Award in Medical Robotics



An engineering team working on AI for surgical robotics at CUHK T Stone Robotics Institute has recently won the Best Paper Award in Medical Robotics at the IEEE International Conference on Robotics and Automation 2021. The award-winning project was led by Prof. Qi DOU, Prof. Pheng Ann HENG from the Department of Computer Science and Engineering, together with Prof. Yunhui LIU, Choh-Ming Li Professor of Mechanical and Automation Engineering.

ICRA is the most important and leading annual international conference in the field of robotics and automation. The winning project by CUHK entitled "Relational Graph Learning on Visual and Kinematics Embeddings for Accurate Gesture Recognition in Robotic Surgery" is an AI system which can accurately recognise the robotic surgical gesture, which is important and fundamental to cognitive assistance and image-guided automation in robotic surgery.

## CUHK Engineering Research Launched in the Market in Partnership with HGC for Advanced Data Security and Smart City Development in Hong Kong

A research team from the Faculty of Engineering and CU Coding Ltd. (CUC) announced the launch in the market of its patented technology nEdge and nCloud solutions with the provision of one-stop managed telecom and ICT services by HGC Global Communications Limited (HGC). The partnership helps CUC to advance its platform, uplift the data security across multi-cloud for enterprises, and boost the Smart City Development in Hong Kong.



The nCloud and nEdge solutions are based on network coding technology, and were founded by Prof. LEE Pak Ching Patrick, Associate Professor, Department of Computer Science and Engineering, CUHK in 2018, and operated by CUC, an Independent Software Vendor (ISV) for network coding technology applications. nCloud is a network coding-based multi-cloud storage system which can significantly enhance data storage security by distributing data among cloud storage providers, thereby lowering operating costs and streamlining access. By connecting Internet of Things (IoT) end-points, nEdge becomes a key technology to boost 5G communications and Smart City development in Hong Kong.

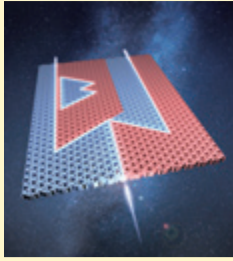
## IEEE Transactions on Signal Processing

Prof. MA Wing Kin Ken named Editor-in-Chief of IEEE Transactions on Signal Processing (TSP), the first in the area affiliated outside North America and Europe. The IEEE Transactions on Signal Processing is a leading journal covers novel theory, algorithms, performance analyses and applications of techniques for the processing, understanding, learning, retrieval, mining, and extraction of information from signals. The service term will run from 1 January 2021 through 31 December 2023.



## New Discoveries in Nanomechanical Topological Insulators may Address Key Challenges in Integrated Circuits

A key challenge in integrated circuits is energy loss from backscattering at interfaces that can degrade circuit performance. To address this problem, Prof. SUN Xiankai's research group developed photonic and optomechanical integrated circuits that are intrinsically free from backscattering by engineering the topology of photons and phonons. They discovered a new degree of freedom in nanomechanical topological insulators, observed backscattering-free chiral edge states, and demonstrated dual-band nanoelectromechanical valley-Hall topological metamaterials.



# INNOVATION AND TECHNOLOGY STUDENT CLUB

To prepare Hong Kong for the upcoming challenges in developing into a knowledge-based economy, the Faculty of Engineering, CUHK has founded the "Innovation and Technology Student Club" (ITSC) jointly with the Innovation and Technology Commission (ITC). Our vision is to nurture young talents in becoming future technological elites, who will bring about innovative and technological advancement to our city. Since May 2009, over 2,000 secondary students with interests in science and engineering have become our club members.

## CUHK Engineering Students Win Awards in the 7<sup>th</sup> Hong Kong University Student Innovation and Entrepreneurship Competition

The 7<sup>th</sup> Hong Kong University Student Innovation and Entrepreneurship Competition was held at Hong Kong Science Park in May. CUHK Engineering students showed active and exemplary participation, winning a number of awards in the competition in the Innovation category and Entrepreneurship category.

Category	Prize	Project	Students	Affiliated Department
Innovation	First	Miniaturised Robotic Steerable Surgical Drill for Confined-Space Bone Work	WANG Yan, LIN Hongbin, WANG Xuchen	Mechanical and Automation Engineering
	Second	Highly Dynamic Nanocomposite Hydrogels Self-assembled by Metal Ion-ligand Coordination	YUAN Wei Hao, YAO Zhi, LAI Chun Him Nathanael, GUO Jia Xin, TUNG Lok Him, XU ShunXiang	Biomedical Engineering
	Second	Automated Ultrasound Guided Needle Tip Tracking System	YAN Wanquan	Mechanical and Automation Engineering
	Third	Age-Induced Deterioration of Neuro-Muscular Junction in Sarcopenia: Study on Gene Expression and Morphology	NG Wing Fai Sofie	Biomedical Engineering
	Third	Face Untouchable	TSE Man Yan, NG Tim Ying	Information Engineering
	Third	Versatile Soft Robotic Upper Limb Assistive Device for the Physically Challenged	SIU Shi Pan, WONG Chi Ka, LEE Tsz Yan, WONG Sin Yi, CHEUNG So Yee, NG Pui Hin	Mechanical and Automation Engineering
	Third	A General Framework for Robotics Vision-based and Lidar-based Applications	LIU Kangcheng	Mechanical and Automation Engineering
	Third	Robotics for Automatic Operations in Indoor Horticulture Farms	SU Man Ngo Rocco, LAU Chun Kit, MAN Cheuk Ying Tiffany, AU Tsz Him Vincent	Mechanical and Automation Engineering
	Merit	In Planta Gene Regulation by Nanotechnology	LAU Yolanda Fong Yung, CHIU Yee Ting	Biomedical Engineering
	Merit	Virucidal, Reusable and Cost-Effective Respirator	LI Pak Hin	Mechanical and Automation Engineering
Entrepreneurship	Merit	Knee Energy Harvester with Variable Transmission from Walking	CHAN Hugo Hung Tin	Mechanical and Automation Engineering
	Merit	Aimimi	CHEUNG Cheuk Nam, Janson, CHAN Wai Kit, LI Yan Lap, CHOI Chun Lok, KWOK Chun Hei, AU Tsz Pok Terrence	Financial Technology
	Merit	Look4kol	KWOK Tsung Yeung, CHAN Po Lam, WONG Kai Yin	Philosophy

## STEM Tutors

Our STEM tutor is led by 4 members from local secondary school and universities. Among the two STEM tutor teams, the first team leads the 3D printing workshop. During the first part of the workshop, participants learned about 3D printing principle and utilised their knowledge, namely 3D printing techniques. For the second half of workshop, they tried using 3D printing pen to create their own souvenir.

Another STEM Tutor Team designed a drone workshop. While participants are polishing their controlling skills, they also learnt about programming the drone so that they can achieve certain goals like flying in a circle and avoiding barriers.



Souvenirs made using 3D printing pen



Participants are learning how to control the drones

## Year-End Ceremony

This year, the theme for ITSC Year-End Ceremony is "To inherit". A total of 8 outstanding ITSC alumni are invited to share their experiences as a long-term member in the Club. Esther, who has been an ITSC member for over 10 years, said that the Club has broadened her horizon as a secondary school student. She eventually became an engineering major. Other members echoed that the Club has helped them in deciding their future study and career path as it provided them with practical experience and knowledge in technological and engineering field.



ITSC alumni and STEM tutor

ITSC is holding a range of activities like technology ambassador, camp and workshops in the coming months. You may review our past events and learn more about them on our Facebook [www.facebook.com/ITSC.HK](http://www.facebook.com/ITSC.HK) page and Instagram [www.instagram.com/itsc\\_cuhk/](http://www.instagram.com/itsc_cuhk/).

If you are a secondary student, you are welcome to join our activities and sign up for ITSC membership through online application [www.itsc.org.hk/chi/membership.html](http://www.itsc.org.hk/chi/membership.html). If you become our member, most activities will be free of charge.

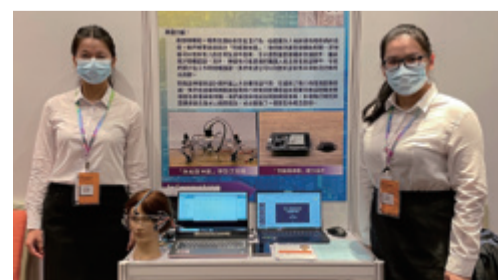
## Mitsubishi Electric Green Innovation Competition 2021

"Mitsubishi Electric Green Innovation Competition 2021" was a STEM competition designed for local primary and secondary school students. It was organized by Centre for Innovation and Technology, CUHK, with Mitsubishi Electric (Hong Kong) Limited and The Hong Kong Science and Technology Parks Corporation as the main sponsor and venue support. This year's theme was "Green Power to Fight Against COVID-19". Participating teams were required to come up with creative ideas for tackling real environmental problems such as the significant climb of take-away wastes during the pandemic.

The competition was held on 7 July 2021, drawing a total of 57 teams from 27 primary schools and 25 secondary schools. It was divided into three parts including the preliminary, public voting and the finals. We received an overwhelming response with nearly 8,000 visitors and over 2,000 votes online. Congratulations to St. Paul's Primary Catholic School and The Methodist Church HK Wesley College for being selected The Most Popular Designs in the public voting, Confucian Tai Shing Primary School and Lok Sin Tong Young Ko Hsiao Lin Secondary School for being awarded Champion of the primary school and secondary school division. For details, please visit [www.cuhk-greenstem.com](http://www.cuhk-greenstem.com)



Three PhD students from the Department of Mechanical and Automation Engineering including (from left) WANG Xuchen, WANG Yan, and LIN Hongbin have developed a miniature robotic steerable surgical drill that enables high-precision orthopedic surgery in a confined space.



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