

COMP @NEWS

Winter 2022

President's Awards for Outstanding Achievement 2022

Prof. CAO Jiannong



PolyU recognises the distinguished accomplishments and contributions of staff members through the **President's Awards for Outstanding Achievement**. We are delighted to congratulate **Prof. CAO Jiannong** (Dean of Graduate School, Otto Poon Charitable Foundation Professor in Data Science and Chair Professor of Distributed and Mobile Computing of COMP), for receiving this prestigious award in the category of **Research and Scholarly Activities (Outstanding Researcher)**, in academic year 2021/22. This year, only six individual staff members and two teams school-wide, who have demonstrated unparalleled achievements, are crowned with this glory and honour.

Prof. CAO is the director, co-director and/ or the founder of several research institutes, including Research Institute for Artificial Intelligence of Things (RIAIoT), Internet and Mobile Computing Lab (IMCL), University's Research Facility in Big Data Analytics (UBDA). He served as the department head from 2011 to 2017. Prof. CAO is currently member of Academia Europaea, a fellow of IEEE, a fellow of China Computer Federation (CCF), and an ACM distinguished member. His research interests include distributed systems and blockchain, wireless sensing and networking, big data and machine learning, and mobile cloud and edge computing. He published 5 co-authored and 9 co-edited books, and over 500 papers in major international journals and conference proceedings. He also obtained 16 patents. Back in 2009, The President's Award for Excellent Performance/Achievement in Research and Scholarly Activities 2008/09 was conferred on him as well.

AWARDS & ACHIEVEMENTS

Prof. GUO Song elected Member of Academia Europaea

Prof. GUO Song, Professor of our Department, has been elected as the **Member of Academia Europaea under the Informatics Section** in 2022.

Prof. GUO's research interests are mainly in edge AI, 6G, big data and machine learning, mobile computing, and distributed systems. His research has been sponsored by RGC, NSFC, ITF, MOST, NRC, JSPS, MIC, JST, industry, etc. He published many papers in top venues with wide impact in these areas.

The Academia Europaea was established in 1988 and is the Pan-European Academy of Sciences Humanities and Letters. Their members are scientists and scholars who collectively aim to promote learning, education and research. Their membership invitations are made only after peer group nomination, scrutiny and confirmation as to the scholarship and eminence of the individual in their chosen field. Election is confirmed by the Council of the Academia.



Prof. ZHANG Lei



Prof. GUO SONG

COMP academics named Highly Cited Researchers

Two academic members of our Department are named **Highly Cited Researchers (HCR)** in 2022, as announced by Clarivate.

Since 2015, **Prof. ZHANG Lei**, Chair Professor of Computer Vision and Image Analysis, has been named HCR in the field of Engineering seven times.

This demonstrates a lasting and significant influence on engineering. According to Clarivate, Prof. ZHANG's research works have been cited more than 27,000 times in Web of Science and his H-index is 79. His research interests include image and video processing, computer vision, pattern recognition and biometrics, etc.

Prof. GUO Song, is one of the only three scholars in Hong Kong who are recognised as HCR in the field of Computer Science this year. He has contributed more than 540 publications in Web of Science and has generated remarkable impact in the field. His research interests are mainly in edge AI, big data and machine learning, mobile computing, and distributed systems.

The 2022 list of HCR is released by Clarivate Plc, a global leader in providing trusted information and insights to accelerate the pace of innovation. The list focuses on contemporary research achievement: only highly cited papers in the sciences and social sciences journals indexed in the Web of Science Core Collection™ during the 11-year period 2011 to 2021 were surveyed. Highly cited papers are defined as those that rank in the top 1% by citations for field and publication year.

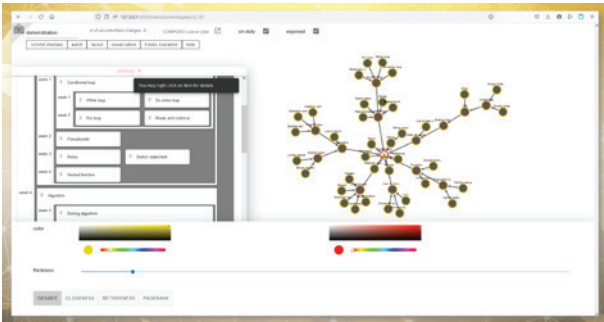
Test of Time Award at SenSys 2022

The research work “**IODetector: A Generic Service for Indoor Outdoor Detection**” by our Associate Professor **Dr ZHENG Yuanqing** and his collaborators (**ZHOU Pengfei**, **LI Zhenjiang**, **LI Mo**, and **SHEN Guobin**) published at ACM Conference on Embedded Networked Sensor Systems (SenSys) 2012 received the **Test of Time Award in SenSys 2022** for “Contributions to intelligent mobile location services with enduring commercial adoption and successful widespread technology transfer”.

ACM SenSys is the premier computer systems conference focused on the architecture, design, implementation, and performance of networked sensing systems, sensor-oriented data modelling and analytics, and sensor-enabled applications. The Test of Time Award recognizes research papers that are at least 10 years old and have had long-lasting academic, industrial and/or societal impact on networked embedded sensing system science and engineering.



IODetector is the first smartphone based solution for indoor/outdoor detection, and also one of the pioneering research works in mobile sensing. IODetector has been successfully integrated in the business of on-demand food delivery service in over 300 cities in China, providing accurate status estimation for over 1 million food couriers which helps improve the delivery efficiency and increase the business profit. The study believes the indoor/outdoor status could be an essential component of the infrastructure information to facilitate mobile applications and systems. Deployment experience and lessons learned are described in a recent experience paper “Experience: Adopting Indoor Outdoor Detection in On-demand Food Delivery Service” in MobiCom 2022.



Knowledge graph (KG) is a knowledge base that uses a graph-structured data model or topology to integrate data. A number of studies in this area use KGs as peripheral sources of educational materials.

A COMP research team proposed a novel framework which employs KGs as a primary tool for instructional design in the paper entitled “**Intelligent Instructional Design via Interactive Knowledge Graph Editing**”. This paper won the **Best Paper Award at the 21st International Conference on Web Based Learning (ICWL 2022)**.

Best Paper Award at ICWL 2022

Authors of this paper include **CHAN Cheuk Kin Jerry (Research Assistant)**, **WANG Yaowei (PhD Student)**, **Prof. LI Qing**, **Prof. BACIU George**, **Prof. CAO Jiannong**, **Dr HUANG Xiao**, **Dr LI Chen Richard** and **Dr NG Hiu Fung Peter**.

The team see the potential of KG technologies in instructional design and education. They believe that it could be utilized for course planning, teaching performance prediction and study plan personalization. Unfortunately, research on KGs for educational application is at a preliminary stage. To expedite the development of KG technologies for instructional design, an application framework that encourages reciprocal collocation between educators and KG research is proposed in this paper. An included design tool would ease instructors to express their ideas in the form of KG when they are preparing their courses. The provided web platform allows users to manage, share and browse KGs of course design.

PhD Candidate received the Best Paper Award at MoMM2022

The paper entitled “**Curvable Image Markers: Towards a Trackable Marker for Every Surface**” won the **Best Paper Award at the 20th International Conference on Advances in Mobile Computing & Multimedia Intelligence (MoMM2022)**. The first author of the paper is our PhD Candidate, **Mr Zackary Ping Tat SIN**. His supervisors are **Dr Hong Va LEONG**, Associate Professor, and **Dr Peter NG**, Assistant Professor. This paper proposed adapting fiducial markers for curved surfaces, which aims at enhancing the interaction in Augmented reality (AR).



AR possesses great potential for productivity, entertainment and communication, inclusive of the mobile context. Although the strength of AR is the blending of physical and virtual environments, current mobile applications seem to focus only on overlaying the virtual part upon the physical one. It is argued that an important direction to explore is how to enhance the interaction in AR such that physical elements can act upon the virtual ones. ARUco is a popular choice in academia for tracking due to its relatively cheap processing cost and requiring only RGB input, making it also suitable for mobile devices. A fiducial marker like ARUco, however, is flat. To move towards enabling it for uneven surfaces, this paper proposed adapting the markers for curved surfaces to be suitable on bandages for warping around objects for tracking. The process involves curve modeling and content extraction.

It also presents an image marker making use of neighborhood features to improve its appeal for AR purposes.

Best UI/UX Award at Cathay Hackathon 2022

Our Year 3 student, **YU Man-Fai Daniel**, won the **Best UI/UX Award at Cathay Hackathon 2022** with a project called “**Tripify**”. As the team leader, Daniel joined hands with three teammates from The University of Hong Kong in creating an app extension for the “Cathay Learn” application. The concept of Tripify is building an ecosystem that not only motivates continuous learning activities by implementing a reward system, but also connects the airline to everyday life of the users.

“*We learnt to adapt innovative ideas and emerging technologies to building real-life solutions.*”

- Daniel

Daniel's team stood out from a hundred teams and reached the final round. In 24 hours, finalists needed to develop a creative application that could address travel and environmental topics. The organiser, Cathay Pacific, prepared a behind-the-scenes tour for the finalists to deepen their understanding of aviation operations, helping finalists develop the application that fits best in real practice.



Most Appreciated Teaching Assistant Award 2021/22

As a token of appreciation for outstanding teaching assistant (TA) performance and to motivate our research students to seek continuous self-improvement, COMP has launched a new award scheme, namely “**The Most Appreciated Teaching Assistant (MATA) Award**” starting from the academic year 2021/22.

After several rounds of discussions and careful consideration, the following TAs outshone the fierce competition and proved themselves capable of delivering good support to tutorials and classes. The scheme will continue, and research students who are confident of their teaching performance and wish to challenge themselves should stay tuned for the coming rounds of the MATA.

Award	Awardee(s)	Prizes
Gold Medal	LIU Ye	Certificate & Personal Research Grant (~HKD30,000) & Tuition Scholarship (~HKD20,000)
Silver Medal	CHEN Shengyuan	Certificate & Personal Research Grant (~HKD30,000)
	REN Da	
Bronze Medal	GONG Borui	Certificate & ~HKD1,000 worth of non-cash incentives
	LI Yanjie	
	SARTAYEVA Yerkezhan	
	ZHAO Kaifa	
	MA Zuchao	
	LING Tao	
	BU Yu	

Teaching Seminar “Hands-on Learning of Robotics Under Different Teaching and Learning Modalities”

On 21 December 2022, **Dr Darwin Lau** from The Department of Mechanical and Automation Engineering of The Chinese University of Hong Kong shared his teaching experiences in our Teaching Seminar. Dr Lau received the Vice Chancellor's Exemplary Teaching Award, University Education Award (Early Career) and the UGC Teaching Award (Early Career Faculty Members) in 2019. In recent years, with the newest global challenges that have changed the way that both teachers and students teach and learn, new teaching modalities have been explored for the hands-on learning of robotics. Dr Lau shared his experiences in providing a richer hands-on learning experience for engineering students with the aid of technology in the seminar with the topic of “Hands-on Learning of Robotics Under Different Teaching and Learning Modalities”. It was an insightful talk, full of exemplary and visionary ideas that are worth learning and putting into practice.



LEARNING & TEACHING

Introduction to AI and Entrepreneurship workshop

Partnering with AI Lab and NVIDIA Deep Learning Institute (NVIDIA), our department organised three sessions of the “Introduction to AI and Entrepreneurship Workshop” for our undergraduate students in January 2023. This workshop covered a full syllabus to prepare students for the examination of obtaining the “Fundamentals of Deep Learning” certificate issued by NVIDIA. Participants learnt about the mechanics of deep learning, the fundamental of entrepreneurship and intrapreneurship, pre-trained models and recurrent networks. They also finished a final project on object classification and proof-of-concept in the workshop.



RESEARCH
EXCELLENCE

Research Project Highlight - Best Paper Award in IEEE Transactions on Computers

A deep reinforcement learning based offloading game in edge computing

Edge computing is a new paradigm to provide strong computing capability at the edge of pervasive radio access networks close to users. A critical research challenge of edge computing is to design an efficient offloading strategy to decide which tasks can be offloaded to edge servers with limited resources. Although many research efforts attempt to address this challenge, they need centralized control, which is not practical because users are rational individuals with interests to maximize their own benefits.

“Different from existing work, this study addresses the challenge that users may refuse to expose their private information.”

This awarded work done by **Prof. GUO Song** and his collaborators (**Yufeng Zhan, Peng Li and Jiang Zhang**) studies to design a decentralized algorithm for computation offloading, so that users can independently choose their offloading decisions. Game theory has been applied in the algorithm design, and the existence and uniqueness of the equilibrium have been proved. Different from existing work, this study addresses the challenge that users may refuse to expose their private information, such as network bandwidth, preference, etc. Therefore, it requires that this solution should make the offloading decision without private information sharing.

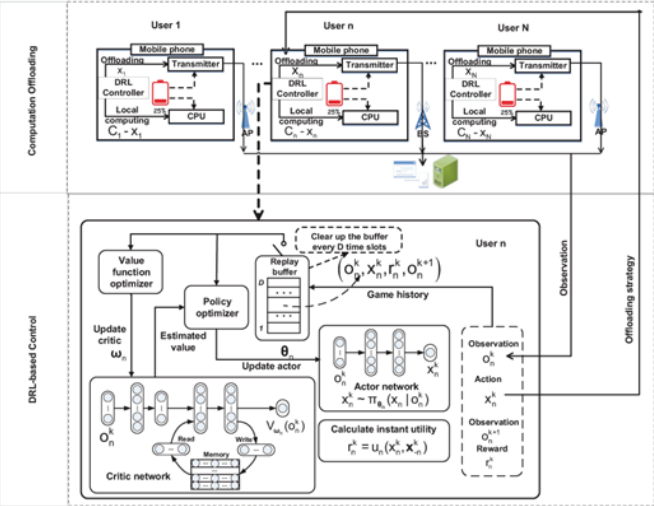


Fig. 1. The system architecture of the proposed approach

This work studies the offloading game and formulates it as a multi-agent partially observable Markov decision process. An algorithm based on the policy gradient deep reinforcement learning and differential neural computer has been proposed to solve this challenging problem.

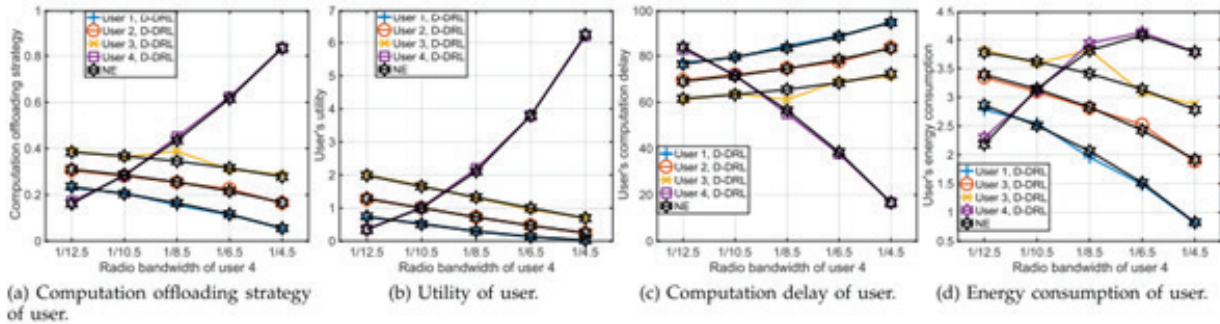


Fig. 2 Performance of the proposed approach as compared with Nash equilibrium

Distinguished Seminar Series on Data Science & Artificial Intelligence

Co-organised with the PolyU Research Centre on Data Science and Artificial Intelligence (RC-DSAI), we have launched a Distinguished Seminar Series on Data Science and Artificial Intelligence since March 2021. World-renowned scholars were invited to share the latest technological development of data science and artificial intelligence with us.



Dr C. Mohan
Distinguished Visiting Professor
School of Software
Tsinghua University

18 Nov 2022
“The Data Landscape:
Trends and Directions”



Research Seminar

To keep our academic staff members and students up-to-date with the leading-edge technical knowledge in computing related disciplines, as well as assist them in gaining exposure to broad range of research topics, COMP regularly invites scholars of different specialisations to present their latest research findings.

Date	Seminar Topic	Speaker	Institution
7 Dec 2022	Non-convex Games for Machine Learning: Models, Algorithms, and Applications	Dr Songtao Lu	IBM Thomas J. Watson Research Center
7 Dec 2022	Post-Quantum Cryptocurrency: Ring Confidential Transactions Protocols in Lattice Settings	Dr Jason Gao	Department of Computing The Hong Kong Polytechnic University
9 Dec 2022	Towards Impactful Research: From Visual Domain Adaptation to Deep Video Compression	Prof. Dong Xu	Department of Computer Science The University of Hong Kong
9 Dec 2022	A Tale of Connecting Massive Things to a Cyber World	Dr Xianjin Xia	Department of Computing The Hong Kong Polytechnic University
9 Dec 2022	Towards Generative Causal Explanations for Graph Neural Networks	Dr Wanyu Lin	Department of Computing The Hong Kong Polytechnic University
9 Dec 2022	Elastic Computing & Communication in Edge: Accommodate Mobility, Heterogeneity and Transmission Loss	Dr Wenchao Xu	Department of Computing The Hong Kong Polytechnic University

EVENT HIGHLIGHTS

PolyU Undergraduate Info Day 2022

The hybrid **PolyU Undergraduate Info Day 2022** ended on 8 October, attracting more than 26,000 visitors to participate in this annual highlight at the PolyU campus and online platform. This year, COMP arranged interactive booth activities and consultation sessions, information seminars and laboratory tours with live demonstrations. The event was the first full-scale physical Info Day after the outbreak of the COVID-19 pandemic.

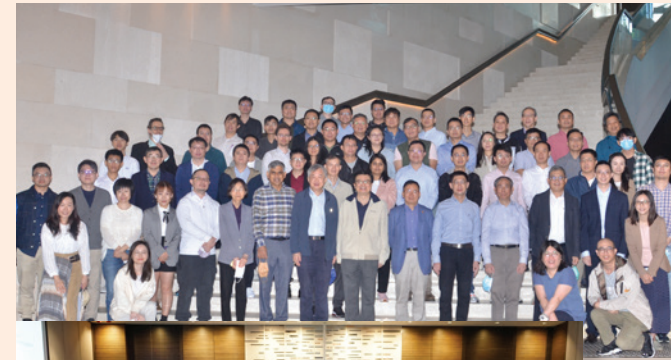
The information seminars covered the features of our BSc Scheme in Computing and AI, general admission requirements and the career path after graduation, which attracted more than 400 students and parents to attend. To enable visitors a peek inside the research and teaching facilities of COMP, guided laboratory tours at our Game Lab were arranged. More than 260 visitors joined the tours and experienced the Mixed Reality applications designed by our students.



The 28th Congregation

The graduation ceremonies of bachelor and master degrees students were successfully concluded on 8 November 2022 at the Jockey Club Auditorium of PolyU. Families and friends of graduates were also invited to join the celebration to share the joy at this memorable moment.

On the same celebrating occasion, The **Outstanding PolyU Alumni Award Awardees of Faculty** who graduated from COMP received their awards from Ir **Prof. H.C. MAN**, Dean of Faculty of Engineering, accompanied by **Prof. LI Qing**, Chair Professor and Department Head. The awardees are **Dr Abraham LAM** and **Mr Darron SUN** respectively. Dr Lam was also the representative of the OPAA awardees and delivered an inspirational speech to the new graduates.



President's Visit to COMP

Prof. TENG Jin-Guang, President; **Prof. WONG Wing-tak**, Deputy President and Provost; and **Mr Simon WONG**, Vice President (Campus Development and Facilities), visited COMP on 8 December 2022. In this two-hour visit, they suggested new perceptions about the application of Metaverse in education during their first stop at our Game Lab. Project team members of Research Institute for Artificial Intelligence of Things then introduced their research works to the guests. After laboratories tour, President's group met COMP academic staff members in-person for direct dialogue. **Prof. LI Qing** presented the recent achievements and challenges of our department, and the plan for the next year. Our engaging staff members voiced out their opinions and gave practical suggestions, while the senior management team responded enthusiastically to the issues raised. The visit ended with a fruitful discussion and a deepening understanding.

COMP Retreat

Retreat gives us a chance to refresh our minds and immerse in deep conversation. Our departmental two-day retreat was held at Hong Kong Ocean Park Marriott Hotel on 28 - 29 November. More than 65 staff members joined this annual event and spent quality time with fellow colleagues. Staff members were eager to exchange insights during the discussion sessions and generously shared their experiences in delivering good teaching and research practices. Escaping from the downtown and routine at work, sinking in calm and enjoying a sweet relaxation, our strong team was fully recharged for top performance.



IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE) 2022



IEEE TALE 2022 was successfully held between 4 to 7 December 2022 under the theme “**Transforming Educational Technologies and Pedagogies for the Next Decade**”. This hybrid conference received 200 registrations from local and overseas.

On 5 December, **Prof. WONG Kwok-yin**, Vice President (Education) delivered a welcome speech in the Opening Ceremony of the conference. **Dr Edmundo TOVAR**, President of IEEE Education Society also virtually greeted the participants. **Prof. LI Qing**, and **Dr Henry CHAN**, General Co-Chair and Technical Programme Co-Chair respectively, then addressed the participants on behalf of the organising committee. A series of keynote presentations and parallel sessions were arranged throughout the conference period, and it was delightful to meet and interact with international peers face-to-face at PolyU. The keynote presentations were given by **Prof. Harry LEWIS** (Harvard University), **Prof. Barbara OAKLEY** (Oakland University) and **Dr Jonathon RICHTER** (Immersive Learning Research Network). The conference also included three workshops, two panels and an interdisciplinary postgraduate student forum.



Open Forum - Post Pandemic Challenge: New Economy and Technologies

An open forum highlighting the **reconstruction in post-pandemic era** was concluded on 10 December 2022 at PolyU and attracted about 100 audiences. Six scholars and professionals were invited to share their novel but solid views on this topic from the perspective of entrepreneurship, 3D printing, Web3, IoT application, FinTech and supply chain. Positive and encouraging feedback was received from the audience, who expressed their excitement about the gain and knowledge enrichment after the event.

Speakers & Topics:

Mr Sky Tang - Founder & Chairman, Chuns Group
Topic: *Entrepreneurship in Hong Kong and Greater Bay Area*

Dr Chris K.Y. Lo - Associate Professor, School of Fashion and Textiles, PolyU
Topic: *Mass Customization of Antiviral 3D Printing*

Mr Michael Yung - Strategic Advisor, Google Cloud
Topic: *Application of Web3 Technology*

Dr Bryan Wong - Chairman, Hong Kong Better Elderly Living Association
Topic: *Turning from Curse to Blessing, application of IoT for better senior living*

Prof. Emil Chan - Hong Kong Digital Finance Association Co-chair and Adjunct Professor of City University of Hong Kong
Topic: *Digital Assets and Central Bank Digital Currency (CBDC)*

Prof. Thomas Chan Man Hung - Director, One Belt One Road Research Institute, Chu Hai College of Higher Education
Topic: *One-belt-one-road and Global Supply Chain*

(Names in presentation sequence)



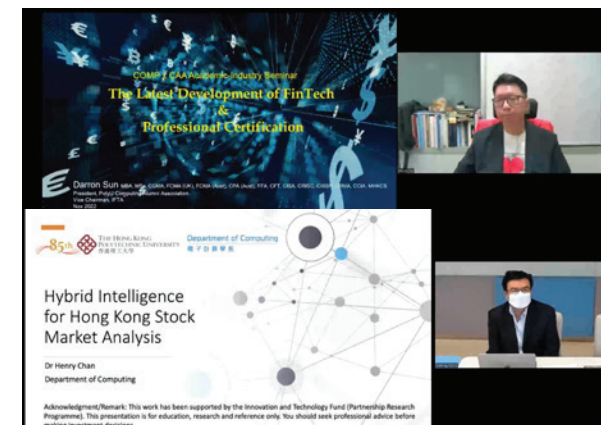
ALUMNI CORNER

COMP x CAA Academic-Industry Seminar Series – FinTech

On 23rd Nov 2022, the final seminar featuring “**FinTech**” in the Academic-Industry Seminar series ended on a high note.

Dr Henry CHAN, our Associate Professor and Associate Head of Partnership and Collaboration, joined hands with **Mr Darron SUN**, the Vice Chairman of The Institute of Financial Technologists of Asia, to discuss the trend and development of FinTech, especially in the post-pandemic era, and beacon participants what kinds of skills and knowledge were necessary for FinTech professionals.

Attended by more than 140 participants in this final seminar, the first series of the Academic-Industry Seminar series was concluded with great success. The seminar series aims to enhance the connection between COMP and alumni, encourage life-long learning, as well as foster possible collaboration between COMP and industry.



Outstanding Alumni Award of PolyU Department of Computing 2023

New round of departmental OPAA 2023 is now calling for **nominations until 31 March 2023 (Friday)**. The departmental OPAA aims to publicly recognise outstanding graduates of COMP for their professional achievements and significant contributions to the community and their alma mater.

There are four achievement categories, namely “**Professional Achievement**”, “**Entrepreneurial Achievement**”, “**Scholarly Achievement**” and “**Community Service Achievement**”. Selection is based on the nominee’s accomplishments in his/her personal achievements in the field, contributions to the community, and support and contributions to PolyU.

Special recognition to **young alumni awardees** in the award category is added. A candidate who is aged under 40 by the end of the award year can be considered under the Outstanding PolyU Young Alumni stream.

Other details of OPAA available on COMP Website. (www.polyu.edu.hk/comp)

Download the nomination form by scanning the QR code.

Nomination by 31 March



DEPARTMENT UPDATES

Promotion



Dr NG Hiu Fung Peter
as Assistant Professor



Dr FUNG Sui Leung Walter
as Senior Teaching Fellow



Dr LIU Yan Wang Dennis
as Senior Teaching Fellow



Dr LUI Wing Cheung Richard
as Senior Teaching Fellow

New Academic Staff



Prof. AU Man Ho Allen
as Professor



Dr HUA Wen
as Associate Professor,
Presidential Young Scholar



Dr CHU Kai fung
as Research Assistant Professor



Dr LI Zecheng
as Research Assistant Professor



Dr LU Xingye
as Research Assistant Professor



Dr Xue Haiyang
as Research Assistant Professor

New Supporting Staff

Miss Betty NG
as Assistant Officer (GO)

Miss Lena LUK
as Senior Clerk (GO)



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