

## Research Assessment Exercise 2020

### Impact Overview Statement

**University: The Chinese University of Hong Kong**

**Unit of Assessment (UoA): 9 Chemistry**

**Total number of eligible staff of the university in the UoA: 22**

**(1) Context** - context for the individual case study(ies)

The Department of Chemistry, CUHK (UoA) which has an exceptional research track record in organic/organometallic chemistry, analytical chemistry and chemical biology. These areas have delivered economic impacts on a wide range of industrial partners, e.g. AYKOW, BASF, etc., ranging from process improvements, pioneering new products and establishment of a start-up company through commercialization and licensing research findings. The UoA also exemplified the strong engagement with the community by public lectures, exhibitions, media coverage, etc. to share research breakthrough, thus enhancing public awareness and promoting STEM education.

**(2) Approach to impact** - the unit's approach to impact during the assessment period for impact  
This UoA has been actively in fostering and maximizing the extra-academic impacts of its research by various approaches.

**(a) Maintaining and bridging industrial collaboration:** UoA members are encouraged to draw upon the services provided by **the Office of Research and Knowledge Transfer Services (ORKTS)** at University level to forge and maintain industry links, support knowledge transfer and establish University's IP licensing. The support from ORKTS has enabled the UoA to **achieve 5 patents granted to date, 2 resulted in knowledge transfer and 1 patent application filed**. UoA members also serves in ORKTS as the Patent Committee Member and participate in the management of the Patent Application Fund to accelerate the extension of impact scope.

The UoA has proactively maintained existing and developed new interactions with industrial partners to ultimately **establish long-term strategic partnerships**. With generous industrial funded grants of **over HKD3.1M** in this census period, research findings from the UoA favour the development in **pharmaceutical, clinical, biomedical, environmental and chemical** industries with the latest technologies. The UoA also secures regular **funding from industries**. For instance, BASF continuously sponsored Prof. To Ngai in projects of material chemistry. UoA members also transfer their expertise by **delivering continued professional consultation or analytical service to, and/or serving as advisors or members** in various industries, e.g. Infinitus (China), Inergi AgroScience, Xinghong Science. A series of **industrial symposia** have been organised with local and worldwide industrial partners, including Comfort Technology Asia, Hong Kong Labware, BASF, KatChem, GenScript, Dieckmann (China), etc. The strong industrial collaboration can be demonstrated by **student internship for undergraduate students**, which are offered by various testing and accreditation, pharmaceutical and diagnostic industries, key examples including BASF, Ling Nam Medicine Factory (HK) Limited, CMA Testing and Certification Laboratories, Fugro Technical Services Limited, etc. These strategic interactions earn the UoA **positive reputation** and incidentally **foster future partnerships**. The UoA has a continuous mission to **nurture young scientists for excelling the innovative research and applying to the society**. The start-up company **Titanology** was founded by PhD and students associated with the UoA in 2015 that is continuing to commercialise the research developed in the UoA (detailed in Yu's impact case.)

**(b) Strong support for public engagement:** The UoA exerts its utmost effort to make the best use of professional knowledge to **serve society and influence policy**. Several UoA members have served as Consultant of Consumer Council, Assessor of Hong Kong Accreditation Service, Board Member of Air & Waste Management Association (HK) and Advisory Committee member of the Hong Kong Green Label Scheme. In respect of **public and educational outreach**, the UoA organised two annual workshops since 2016, namely **"Experimental Challenge"** and **"Kids' Lab"** with BASF to arouse teenagers' and children's (aged 6-12) interest in chemistry. Number of participants for these events are 182 (students from 36 local secondary schools) and 2200, respectively. It is noteworthy that for the former event, the number of audience reached approx. 400 and the latter event even recorded

8,818 registrations in 2018. **HK SciFest**, co-organised with Hong Kong Science Museum since 2014, has provided interesting scientific activities to arouse public awareness of the UoA latest research and STEM education, inspire the next generation of scientists. In addition, the UoA organise the **Lecture Series on Modern Chemistry with Royal Society of Chemistry** every year. On Faculty level, STEM education is also promoted by the UoA through the **Science Academy for Young Talent. Popular Science Talks Series** (since 1991), and **Lau Oi Wah Memorial Science Lecture Series** (since 2005) have been hosted to explore forefront scientific topics of the modern world for the future scientists. By answering enquiries from the press whenever there were chemical-related incidents, the UoA has a channel to deliver correct and accurate daily scientific knowledge and raise public awareness. In 2016, Prof. Steve Tse participated in a local **educational TV programme**, “Sidewalk Scientist”, which explores the scientific knowledge in daily life through different experiments. The average audience measurement was 20.01, reaching over 130000 audiences.

(c) **Impact development:** Since the result publication of the 2014 RAE exercise, dedicated **taskforce of non-academic impacts** was setup to oversee the development of non-academic impact in the UoA. Throughout 2015-17, a number of **working groups** were established under the taskforce to address various aspects relevant to non-academic impacts, extend and consolidate the potential non-academic impacts of the UoA members, and strategically allocate resources to nurture potential non-academic impacts. Concurrently, the UoA seeks advices from **external professional consultants** to guide the development of UoA. To exemplify, in 2017, a UK REF expert was invited to share his experience with the UoA members. Insights from external parties nurture the UoA members to further develop the possible non-academic impacts and recruiting and identifying candidates to heighten various impacts.

### (3) Strategy and plans - strategy and plans for supporting impact

To further realise the above-mentioned missions of the taskforce, a **Departmental RAE panel** has been formed since 2018 to closely monitor the research impacts, maintain key elements of existing strength and optimize the non-academic benefits of the cutting-edge research by following strategies: Continue to collaborate with ORKTS to offer skills and **training sessions** for UoA members to encourage spin-out company generation and commercialization. (b) Schedule **regular consultations** with ORKTS to facilitate the impact developments and utilise their professional feedbacks onto the impact cultivation. (c) Provide **Project impact enhancement fund (PIEF)** for potentially impactful research activities in UoA. (d) Support UoA members participating in the **Impact Postdoctoral Fellowship Scheme (IPDFS)**, which can facilitate the research activities related to non-academic impacts. In 2019, Prof. Dennis Ng and Prof. To Ngai independently received 1 million HKD. (e) Proactively organize workshops and activities with companies to **facilitate industrial collaboration**. For instance, a symposium on New Frontier in Healthcare-Gas Sensor Technology and Clinical applications have been organised in the UoA in 2019 with Qi Diagnostics sponsorship. (f) Provide an incentive to UoA members to conduct research works in alignment with the strategic impactful research including catalysis and material science. (g) Attend a **workshop at UCSD** to acquire essential skills for impact development, including intellectual property negotiations and licensing, seed and need-driven innovation and commercialization; so as to drill in ways for **sustainable impact development**.

### (4) Relationship to case studies - the relationship between the unit’s approach to impact and the submitted case studies

The UoA submitted 2 impact case studies, having direct bearings on the UoA’s approach to impact through **commercialisation of research finding via industrial collaboration** to develop new products and improve the manufacturing process to resolve the market challenges. Yu’s impact case also exploits the impact with **public engagement** by public talks, exhibitions and media coverage. Both case has exemplify the UoA approach of **impact development** under the nurturing of the UoA impact strategic resources. The aforementioned impact cases are undoubtedly the solid milestone of UoA’s current direction.