

Research Assessment Exercise 2020

Impact Overview Statement

University: The Chinese University of Hong Kong

Unit of Assessment (UoA): 10 Earth Earth Science (incl. oceanography, meteorology) and Other Physical Sciences (incl. environmental science)

Total number of eligible staff of the university in the UoA: 7

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

The UoA comprises seven colleagues from two academic units in the Faculty of Science: 6 from the Earth System Science Programme (ESSC) founded in 2012, and 1 from Environmental Science Programme (ENSC). The research of ESSC can be categorized into the broad areas of **atmospheric science, geophysics, and ecology & biogeochemistry**, whereas that of the ENSC researcher is in **environmental microbiology & technology**. Both programmes strive to establish synergistic links with a diversity of stakeholders, with impacts of our research extending to **economy, policymakers and the broader public**. In particular, ENSC has as one of its research priorities the transfer of environmental technology for improved economic performance. For over 25 years, ENSC has accumulated an extensive track record of this impact pathway, exemplified by our impact case on “The Pollution Control by Advanced Cost-Effective Photocatalytic Treatments”.

Impacts on government policy derive from the active participation of ESSC colleagues in research and policy debate. The impact of the UoA also exerted on improving professional standard by productive collaboration and active dialogue with local or international governmental stakeholders, as well as environmental & geotechnical companies. In addition, the UoA proactively engages in a multiplicity of outreach activities, hosted by or in collaboration with the Hong Kong Science Museum, HKO, and Jockey Club Museum of Climate Change, as well as strong engagement with the society by public lectures, STEM education, media coverage, etc.

(2) Approach to impact - the unit’s approach to impact during the assessment period for impact Impact is considered to be an essential and critical element in our overall research strategy, from university leadership down to programme level. Related research activities are systematically nurtured through seed funding and space allocation.

(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. During this RAE period, the UoA filed one Chinese patent application and generated one granted Chinese patent. The University also has deployed the **“Policy on Research, Intellectual Property and Knowledge Transfer”** in 2015 to nurture innovation, entrepreneurship and knowledge transfer for the advancement of humanity. Connection with industrial partners is considered to be of strategical importance. Though the history of ESSC is relatively short, industrial collaborations with Arup, ClusterTech Ltd., Nvidia, PetroChina and Zike Environment have been established. Student internships have been offered by our industrial partners, including Business Environmental Council Limited (BEC), CH2M, ClusterTech, CM Wong & Associates Ltd., and EGS. Colleagues are also encouraged to seek funding from the government’s Innovation and Technology Fund (ITF) to initiate and grow such industrial partnership. Indeed this has been the path for the seeding and maturation of the UoA impact case. Subsequently, the UoA has also benefitted from the university’s Project Impact Enhancement Fund which was exemplified by the impact case.

(b) Forging collaborative research engagement with environmental policy community: Strong linkage between the UoA and professional bodies has been forged. Colleagues are supported to undertake collaborative research with government agencies and the private sector. UoA members are embedded in local and international policy regarding the global environmental change, natural hazards and sustainability, in particular, on issues of critical local, national and global concerns, including air quality and anthropogenic activities, deglaciation and cryogenic dynamics, earthquakes potentially induced by hydrocarbon extraction and storage. The UoA works with a diverse range of

research partners including the **Hong Kong Observatory (HKO)**, **HK Environmental Protection Department (EPD)**, **HK Civil Engineering and Development Department (CEDD)**, **China Earthquake Administration (CEA)**, and **U.S. National Earthquake Hazards Reduction Program (NEHRP)**. The UoA also proactively place students for internship in public sectors, including HKO, EPD, CEDD and Hong Kong Airport Authority (HKAA). In academic year 2018-2019, a total of 22 ESSC students (almost 20% of all the majors) participate in internship offered by 10 sponsors from the government and private sectors. In particular, we have altogether 8 student interns in HKO this year, which constitute more than half of the total and correspond to the largest number for a single academic unit in the region.

(c) Engagement with general public: The UoA recognises the value of engagement with the general public. Diverse outreach activities have been hosted by the UoA or in collaboration with the **InnoCarnival, Eco Expo Asia, Hong Kong Science Museum, HKO, and Jockey Club Museum of Climate Change (MoCC)** at CUHK to provide scientific activities and exhibitions since 2013 with the reach of extensive audience. Students from UoA have actively participated in the “MoCC Ambassadorship” internship programme to raise climate change awareness and promote sustainability on and beyond campus. In addition, STEM education for secondary students was also promoted by the UoA through the programme of **Science Academy for Young Talent** (since 2015 summer) and **Faculty Distinguished Lecture Series** (since May, 2019) on Faculty level. Featured interviews with the UoA members are often published in local and international media including CNN, Wall Street Journal, Financial Times, Sing Tao News, Ming Pao, RTHK, etc. to deliver daily scientific knowledge about earth system and raise public awareness about global climate change.

(d) UoA policy on impact development

Impact delivery is highlighted and recognized in this UoA. Policy on annual staff appraisal, pay review, and promotion exercise was set in relation to impact. Colleagues are also encouraged to join the professional training offered by ORKTS to recognize the need for knowledge transfer and forging industrial partnership.

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

A. Leveraging funding from the university, the UoA will proactively identify research projects potentially of high impact, and strategically allocate funding and space to nurture and enhance such endeavors.

B. The UoA will continue to collaborate with and request ORKTS' services to apply and file research patents; extend and deepen our local and international partnership with industry and government agencies for external funding, research opportunities and student internships.

C. The UoA will seek synergistic collaboration with colleagues in other UoA to develop new interdisciplinary pathways to impact.

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

The submitted impact case spearheaded by Prof. Po Keung Wong exerted economic impact by filing a patent application and generating a granted patent. The patented technology was exploited by a Chinese benchmarking eco-innovation enterprise for new products development, with the support from UoA and ORKTS. The underpinning research by Prof. Wong also delivered impacts on society through public exhibition and media interview.