

Research Assessment Exercise 2020
Impact Overview Statement

University: City University of Hong Kong |

Unit of Assessment (UoA): 15. chemical engineering, biomedical engineering, other technologies (incl. environmental engineering & nautical studies) and marine engineering |

Total number of eligible staff of the university in the UoA: 21 |

(1) Context

Out of the impactful research activity with the UoA at CityU, two representative examples are given here, which demonstrate not only excellence in academic research, but also great translational value/potential to achieve social impact. The context for each one is summarized below.

1) Intelligent Sensors for E-Channel Auto-pass Systems for Passengers at the Hong Kong Immigration Gate:

Yearly, approximately 260 million passengers pass through the immigration gate of Hong Kong. An intelligent sensor system to detect the status of passengers at the E-Channel is crucial to the smooth operation of the auto-pass system. Dong Sun and his team developed an intelligent P-beam sensor system, with a China patent number of CN ZL 2009 2 0218477.1. In 2012, the technology was transferred to local industry for commercialization. The sensor is used at the HK immigration gate, which has been producing an annual revenue of more than HK\$10 M since 2013.

2) Invention of Electrophysiological and Inertial Motion Detection Systems:

Movements are reflections of the human status from muscular actions to locomotion. The team developed multiple advanced systems with real applications, including biopotential sensing for electromyography, electrocardiography (ECG) and electroencephalography (EEG) for disease diagnosis, ambulatory monitoring and rehabilitation. The team developed motion sensing/positioning systems for applications, such as surgery assistance and interactive modules applied to public/commercial exhibition platforms. This research was supported by two Innovation and Technology Funds and resulted in three papers in academic journals and two patents as well as contributing to various projects (with a grand total of over HKD30M) of collaborating companies. It has been presented in several exhibitions and reported widely in the news. |

(2) Approach to impact

The scope of research evaluations becomes broader as the societal products, societal use, and societal benefits (changes in society) of research come into scope. Society can reap the benefits of successful research studies only if the results are converted into marketable and consumable products (e.g., medicaments, diagnostic tools, machines, and devices) or services. Towards this goal, different aspects have been introduced which refer to the societal impact of research at the UoA, including third stream activities, societal benefits, societal quality, usefulness, public values, knowledge transfer, and societal relevance. What most of these aspects are concerned with is the assessment of social, cultural, environmental, and economic returns (impact and effects) from research output or research outcome (product) of publicly funded research. This concept and vision serve as a basic approach for the development of robust and reliable methods of societal impact measurement.

(3) Strategy and plans

The UoA mainly supports exploration of impact via the following strategy and plans:

1. Promotion of research excellence

As the academic research faces an increasingly competitive environment for ideas, talent and funds, all faculties of the UoA are encouraged to get research grants on a competitive basis. Especially, the department has designed an instrument to encourage outstanding research by large-scale, long-term investment for the improvement or extension of physical infrastructure and core facilities, the recruitment of outstanding researchers internationally.

2. Promotion of Knowledge Translation & Translational Research

Research translation is the process whereby knowledge is passed anywhere along the translational pathway, and Translational research is research that looks at how best to translate research into practice and/or policy e.g. research that addresses particular gaps in translation. These are regarded as the key elements of the research activity of UoA along the path to social impact. Thus, the team have been especially focusing on the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening biomedical related systems and improving people's health, and has been promoting translational research that could be regarded as any type of research that has a high capacity for translation and that addresses existing gaps in translation.

3. Promotion of academic-industrial collaboration

This UoA highly values the society benefits from academic-industry research relationships through innovative products and technologies, which often drives the development of practical applications to benefit society. These applications include newly improved medical devices, techniques, and therapies. Good academic-industry research relationships strengthen both parties either through the generation of innovative products developed from current research or through a redirection of industrial development to more profitable lines, R&D is positively affected. |

(4) Relationship to case studies

The presented case studies are two examples that entail the general philosophy to achieve significant social impact, as a leading research unit in Hong Kong. The impacts of both cases are rooted in the research innovation by the research team led by our faculty members, who have been highly aware of the UoA's approach and strategy for exploring social impact in relevant research activity. |