



香港城市大學
City University of Hong Kong

Inigorating the teaching-research nexus: massive research immersion for engineering undergraduates

Project Number: 6000697

Principal Investigator: Dr. Derek HO

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Abstract:

In a traditional undergraduate curriculum, students are primarily taught in a classroom and exam setting. This mechanical, information-fed learning style has been shown to be rather limited in enabling advanced learning, which is essential preparation for academic and industrial research. Research experiences benefit students in multiple dimensions, including improved openness to surprising results, objectivity, honesty, tolerance, persistence, analytical rigor, and creative thinking. A benefit of undergraduate research is that they lend themselves very readily to a group approach, mimicking the high-impact research model in most fields. However, research projects at the undergraduate level have been confined to honors students in their final year, severely limited student exposure to research.

The main objective of this project is to provide engineering undergraduate students with the experience of conducting small-scale research. Through a guided, short-term investigation, the immersion will teach the scientific research method, via a series of steps such as framing the research question, literature review, choice of methodology, data gathering, academic writing, reaching conclusions and identification of further research needs.

The impact on student learning is expected to be the infusion of the value and skills of the scientific researcher. This will better prepare students for academic careers and advanced industrial developments. As a side benefit, the project may also boost the interest of undergraduates proceeding to post-graduate programs, a goal of great strategic importance to both CityU as well as to Hong Kong.

Academic Publication:

Cheng, W., Fu, J., Hu, H., & Ho, D. (2021). Interlayer structure engineering of MXene-based capacitor-type electrode for hybrid micro-supercapacitor toward battery-level energy density. *Advanced Science*, 8(16). <https://doi.org/10.1002/advs.202100775>