

THE EDUCATION UNIVERSITY OF HONG KONG
FACULTY OF LIBERAL ARTS AND SOCIAL SCIENCES

Research Output/Impact/Knowledge Transfer Prize
for the Dean's Research Fund 2018-19

**Brief Introduction of Awardee's
Research/KT Publication/Study/Output and Future Research/KT Development**

Awardee (Dept): Dr. Yuen Man Wai, Assistant Professor (MIT)
Publication Title/KT project: Pulsating flows of the 2D Euler-Poisson equations

A. *Briefly introduce your research/KT publication/study/output for which you have received the prize.*

It is well known that solutions of gaseous or fluid dynamical systems can easily blowup or develop shock waves in finite time. In this paper we show the existence of a class of “radially symmetric” rotational solutions to the two-dimensional pressureless Euler–Poisson equations. The flows are global and have compact support at all times, and pulsate periodically. The method of construction is novel. It comprises the piecing together of suitable shells of moving particles in a delicate manner with careful choice of initial data. Each shell is the solution of a member of a continuum of ordinary differential equations. Detailed analysis of the equations is carried out to ensure that neighboring shells can be chosen to pulsate with the same period.

B. *How you used/will use your prize and perhaps its usefulness to your research/KT development?*

We will change the funding use for inviting some visiting scholars to come to EdUHK for the seminars sharing and the potential research collaboration. We will focus on the development of the new methods for showing blowup phenomena and global existences of the compressible Euler equations.

C. *Expected research/KT outcomes/outputs/impacts arising from this prize.*

We expect the following article and seminars sharing by the visiting scholars to produce the joint research works on the prize.

1. Yuen, M.W., New Blowup Phenomena of C^2 Solutions with Rotation of the Euler equations, Pre-print, Planned to Submit to Nonlinear Analysis-Theory Methods and Applications, Ranked A Journal