**Project Title:**

**Development of Novel Microfluidic-based Platforms for CTCs Isolation from Whole Blood**

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According to the World Health Organization (WHO) data in 2010, cancer is expected to overtake ischemic heart disease as the leading cause of death in the world. Jordan in specific, cancer is considered as the second leading cause of death after heart disease. However, cancer diagnosis and treatment in early stages still very limited due to the expensive and limited detection methods. Recently, the isolation and analysis of Circulating tumor cells (CTCs) have drawn researcher attention as it considered live indication for the health status of cancer patient. In this project, the development of novel microfluidic-based platform for the isolation of CTCs based on their physical properties is proposed. Two types of microfluidic platforms, namely spiral microfluidics and centrifugal microfluidics, will be integrated for improved isolation performance. The integrated platforms will take advantage of the CTCs larger size (~ 10 – 20 µm) compared to other hematologic cells (RBC ~ 8 µm, Leukocytes ~ 7 - 12 µm). The proposed integrated platform is expected to have two main advantages: first, is the isolation of CTCs from whole blood sample without any pre-treatment steps. Secondly, the proposed platform will not require external pumping method (syringe pump) due to the use of centrifugal base platform for liquid manipulation. This will improve the portability of the developed device to be used in point-of-care (POC) and in source limited areas.

**Applicants** must have study background in mechanical/mechatronics/computer engineering or closely related fields.