**Research Theme:** **Behavioral Neuroscience; Integrative Oncology**

**PhD Research Project Title:** **Balance Control in Cancer and Effects of Integrative Therapies**

**Scholarship category (Please indicate the source of funding for this project):**

**(a) SBS Research Student Scholarship (for SBS faculty only)**

**Principal Investigator/Supervisor: Mingxiao Yang**

**Co-supervisor/ Collaborator(s) (if any):**

## Project Description

**a) Background:**

Poor balance control is a debilitating condition that affects up to 50% of patients living with cancer, contributing significantly to increased fall risk, injury, and mortality. Side effects and complications from neurotoxic chemotherapy, hormonal therapy, and other cancer treatments—such as peripheral neuropathy, joint and muscle pain, and cognitive impairments—are leading contributors to postural instability. Previous studies have shown that high-impact pain and sensory loss are prevalent in this population, disrupting sensory processing and integration. However, the specific mechanisms linking sensory dysfunction to impaired balance control in cancer patients remain poorly understood. Currently, there are no effective, evidence-based strategies targeting balance dysfunction in oncology care. Supportive interventions such as Tai Chi and therapeutic massage have shown preliminary promise in improving sensory function and dynamic balance in cancer survivors. This project aims to delineate the role of sensory processing on balance control in a cohort of patients at a high risk of falls due to active cancer treatments and examine the clinical effects of integrative medicine.

**b) Proposed work:**

- Observational cohort study to assess the impact of sensory processing deficits in balance impairment, leveraging quantitative sensory testing and sensor-based wearable balance monitoring.
- Randomized clinical trial to evaluate the clinical efficacy of integrative therapies to enhance sensory integration, cognitive-motor control, and fall prevention.
- Translational science study to explore the underlying neurobiological mechanisms with advanced neuroimaging approaches (i.e., fMRI, EEG, etc).

**c) Preferred skills: behavioral neuroscience, epidemiology, clinical trial, and/or Chinese medicine. Computation work on data analysis would be a big plus, but not indispensable.**

## Supervisor contact:

**If you have questions regarding this project, please email the Principal Investigator:**

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## SBS contact and how to apply:

Associate Chair-Biological Sciences (Graduate Studies): AC-SBS-GS@ntu.edu.sg

Please apply at the following:

**Application portal:**

https://venus.wis.ntu.edu.sg/GOAL/OnlineApplicationModule/frmOnlineApplication.ASPX