About me

Welcome to Mohamed marzouk’s “ モハメド　マルゾーク” website.

My story begins in 2005, when I enrolled in the Faculty of Science at Ain Shams University in Cairo, Egypt. In my first year as an undergraduate, I studied a wide range of disciplines, including chemistry, physics, mathematics, and biology. In the meantime, my grandfather passed away following a long battle with cancer, which was one of the main reasons I chose biophysics as my major for my B.Sc. Since then, I've known that I want to devote my life to cancer research to one day aid others all around the world in their struggle against this fatal disease. In 2009, I graduated as top of biophysics students and top of physics department students, with graduation project about one of the advanced types of radiation therapy used to treat cancer called Intensity-modulated radiation therapy (IMRT).

My academic career began in 2010 when I was hired as a demonstrator by the biophysics group in the physics department to assist students with their laboratory work and physics assignments. In 2012, I commenced my M.Sc. at Ain Shams University, where I learnt laboratory molecular genetics techniques, such as PCR and RT-PCR, that enhanced my understanding of DNA and protein structure and dynamics. I realized at the time that experimental research progression is slow, but computational research has a better throughput. So, rather than conducting experimental research, I believed that computational biology could help me achieve my dream of assisting millions of cancer patients worldwide. As a result, I decided to pursue a Ph.D. in computational molecular dynamics.

In 2019, I was awarded a scholarship from the Egypt-Japan Education Partnership (EJEP) to begin my Ph.D. at Tokyo Institute of Technology's School of Life Sciences and Technology. In my Ph.D. research, I used one of the enhanced sampling techniques referred to as parallel cascade selection molecular dynamics (PaCS-MD) in combination with the Markov state model (MSM) to further explore biological slow processes such as binding/unbinding (for protein−DNA, and protein−ligand) and open/close for protein binding pockets.

In 2022, after graduation I joined Molecular Modeling and Simulation (**MMS**) Team as a postdoctoral researcher in National Institute for Quantum Science and Technology (**QST**), Chiba, Japan. Currently, I am working on a project to quantify protein stability and predict the impact of mutations, which has significant implications for protein engineering and drug design. Particularly, focusing on the effect of addition/deletion mutations and salt bridges double mutations on protein stability through alchemical transformation using one of the enhanced sampling techniques known as replica exchange with solute tempering (REST) in combination with free-energy perturbation (FEP) to predict the stability indicator free energy difference (ddG).

Away from my academic life, my enthusiasm for sports and active living has done wonders for my physical health. I enjoy swimming on the weekends, and I have recently started playing tennis, one of my lifetime passions, and I love it. I am also a great football player who plays once every week with researchers from QST institute.