My name is Felicia Magpantay and I am an Associate Professor in the Department of Mathematics and Statistics at Queen's University. Here are some details on the work I do in applied mathematics:

Research area 1: A lot of mathematical tools are geared towards the identification and analysis of the equilibria and absorbing sets of systems. However, there are many long-lasting non-asymptotic behaviours that are also very important in applications. Models of fishing systems may feature "population collapses" wherein biomass can temporarily crash to very low levels despite strict management efforts. Epidemiological models can exhibit "honeymoon periods" after the onset of mass vaccination which may end with a disease resurgence. My group is working to expand our theoretical framework on long transient dynamics.

Research area 2: Infectious diseases are the leading causes of death for children in low-income countries. Mathematical modeling is a powerful tool for studying many types of complex systems, including the spread of infections. We combine modern techniques from analysis and applied mathematics with innovative methods in scientific computing to tackle high-dimensional and multi-faceted modeling problems.

Research area 3: Delay differential equations (DDEs) are differential equations wherein the rate of change of the state of the system depends on values at previous times. Much of the theory on DDEs focus on constant and time-dependent delays, but many delays are naturally state-dependent (SD). For example, in ecology we can expect that a population's growth rate depends on how long it takes for newborns to enter reproductive maturity. Under the restriction of limited resources, this delay depends on the population size. My group works on both the theory and applications of SD-DDEs.

If you find these problems interesting or would like to hear more about my research, please contact me at felicia.magpantay@queensu.ca