# Designing a Litter Box That Neutralizes Toxoplasma gondii: A Parasite That Causes Toxoplasmosis in Humans

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Toxoplasma gondii is a parasite that causes an infection, Toxoplasmosis in humans. Pregnant women can get this infection if the eggs of the parasite, which are found in the cat's feces, are ingested orally. This infection can be also passed on congenitally, increasing the risk of being born with abnormalities. Since there are no vaccines made for human or cat use at the moment, designing a litter box that neutralizes the parasite will decrease the risk of pregnant women from getting infected. The litter box will be self-cleaning meaning that the clumped litter will be moved to the disposable side with the improved design of the motion sensor rack. This allows the litter to be moved around, making UV lights efficient to use since they can destroy microorganism's ability to reproduce. The UV lights will be designed to have motion sensors and placed on two sides of the litter box. For this project, samples of T. gondii could not be obtained due to the health risks so samples of gram-positive and gram-negative bacterias were used throughout the project. Although parasites and bacteria are different from one another, this project was based on a protocol developed by a group of researchers where T. gondii was successfully inactivated multiple times with the use of UV light (Kannan, 2014). Some Petri dishes with bacteria were placed under UV light for some time and then placed into the incubator, while others were placed directly into the incubator. After a day or two, the Petri dishes were then compared to one another for growth. The Petri dishes that received UV light showed no growth, supporting the hypothesis. During the designing process, the ranked criteria were based on affordability, motion sensor accuracy, neutralizing effectiveness, and safety of the litter box.

**Awards Won:**