

# Testing the Efficiency of Aquaponics Filtration Systems



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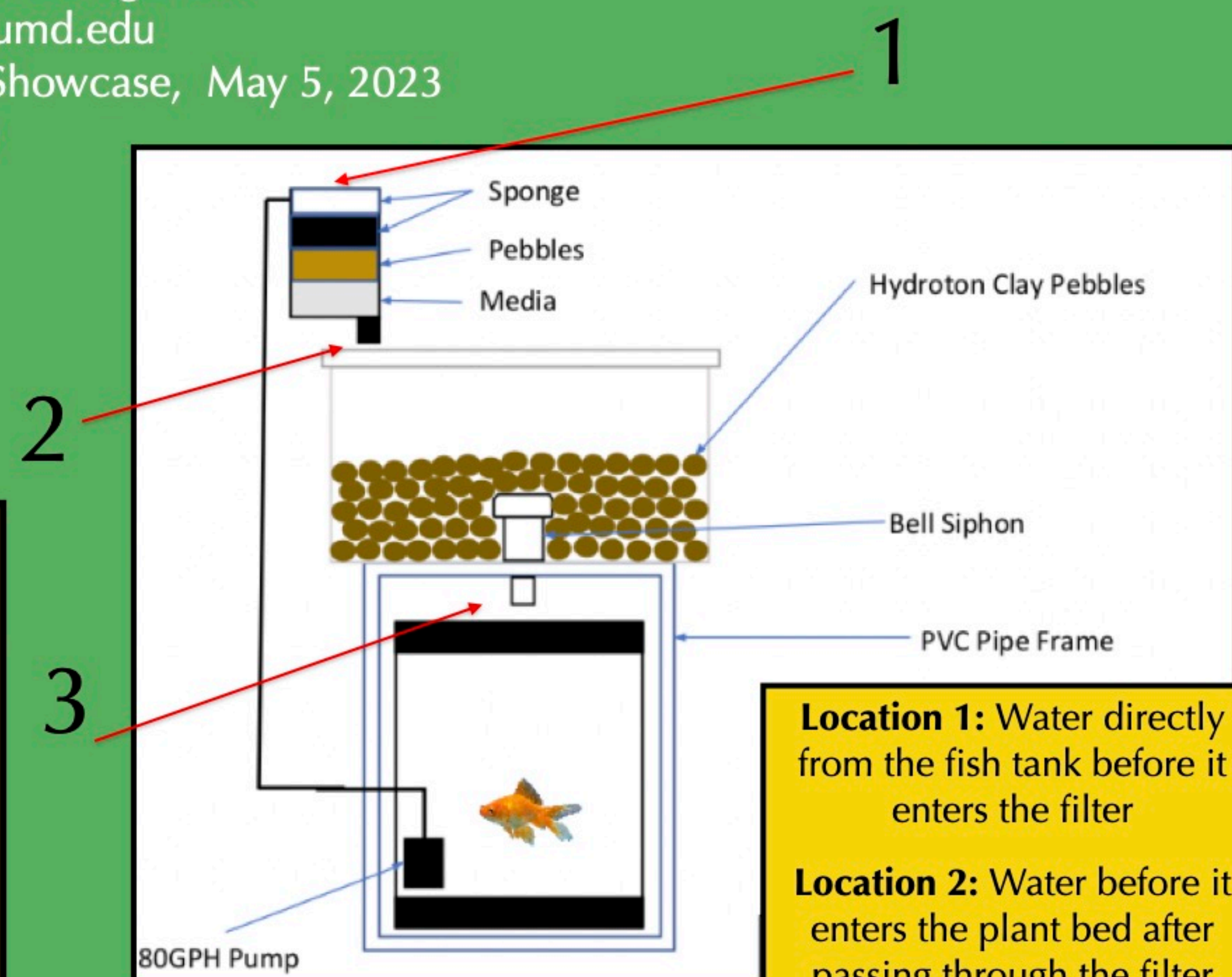


## Introduction

I worked as a Lab assistant in the Aquaponics Research Lab here at UMD, under graduate student Jonas Lee. We worked on a project investigating how to make aquaponics systems more efficient for use for places like space stations.

### Aquaponics Overview:

Aquaponics systems work by pumping nutrient rich water from a fish tank up through a filtration system and into a grow bed with plants. The water is then inputted back into the fish tank. The nutrient rich water from fish excrements works as a fertilizer. The goal of aquaponics is to grow plants more sustainably, using less water and without the need of soil. See the image below for the system, and the graphic to the right for the mechanism.



**Location 1:** Water directly from the fish tank before it enters the filter

**Location 2:** Water before it enters the plant bed after passing through the filter

**Location 3:** Water after it passes through the plant bed

Image courtesy of Jonas Lee



The aquaponic system in Dr. Izursa's Lab where we conducted our data collection.

### Activities:

We first had to take a baseline set of data to see the impact of the filters on the system without any additional materials. We tested water at 3 different locations within the system for Nitrate, Nitrite and Ammonia concentrations. The testing locations are labelled in the graphic above.

We tested 12 aquaponics systems that did not have any plants in them, testing 4 systems each testing day. Then, we compiled all the data to get the average concentrations among the 12 systems for each nutrient at each location.

### Results:

After analyzing our data, we found that there was no significant difference between levels of nutrients at different locations.

### Discussion/Impact:

This data will be used as a baseline for the rest of Jonas' research. Since there was no significant difference, this will allow for research into different materials to add into the filter, ones that will reduce nutrient concentrations. The ideal material will be able to grab the nutrients out of the water as it passes over the material, cleaning the water for more efficient plant growth.



Photo of me performing water quality testing on a sample!

### Site Information:

Aquaponics Research Lab  
UMD ENST Department, Animal Science Building  
Supervisor: Dr. Jose-Luis Izursa  
Mission: Conduct research surrounding aquaponics systems and their benefits, function and efficiency.

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