



WEBER STATE
UNIVERSITY

Aqua-Life

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Weber State University Facts

- 25,000 students
- 250 undergraduate degrees programs
- Engineering Technology Department
 - 4 Year B.S. Degrees (ABET Accredited)
 - *Manufacturing Engineering Technology*
 - *Design Engineering Technology*
 - *Electronics Engineering Technology*
 - *Mechanical Engineering Technology*



Senior Project (Capstone)

- **Capstone experience**
- **Demonstrate how well they have mastered the technical skills**
- **Mastery of *communication, human relations and management skills***
- **Takes two semesters:**
 - First semester to plan, research, and design
 - Second semester to fabricate





- **AQUAPONICS SENIOR PROJECT: Aqua-Life**
- **Collaboration with Horimasa Ltd. Co and University of Hawaii**
- **FALL AND SPRING SEMESTERS 2013-2014**



College of Tropical
Agriculture and Human
Resources



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Aqua-Life team

- Two advisors and six students: one from EET, two from DET, and three from MFET
- First semester: research, plan, design, cost analysis
- Second semester: fabrication
- Budget: \$10,000 (material only)
- Incentive \$5,000 to Hawaii
- Produce an aesthetically pleasing system that is a combination of Aquaponics and VEGILAB technologies

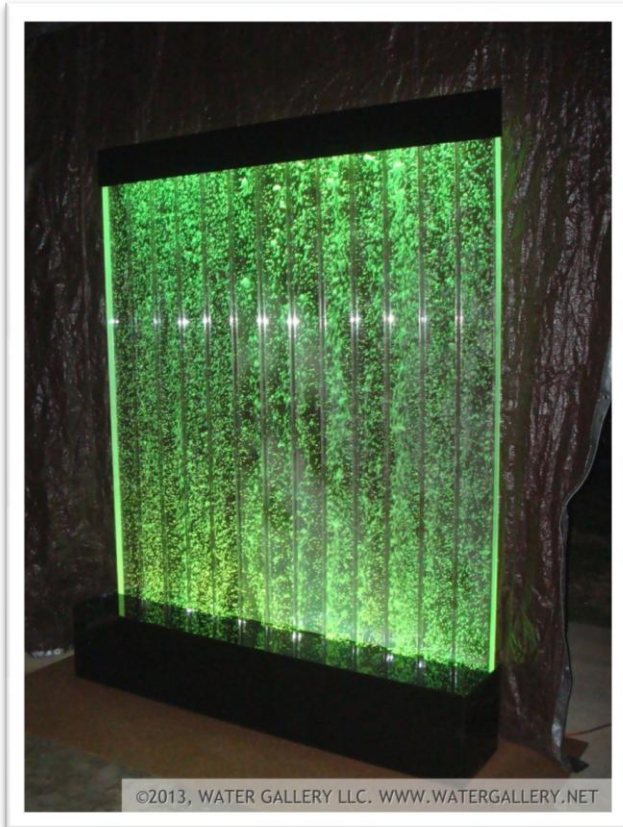


Research

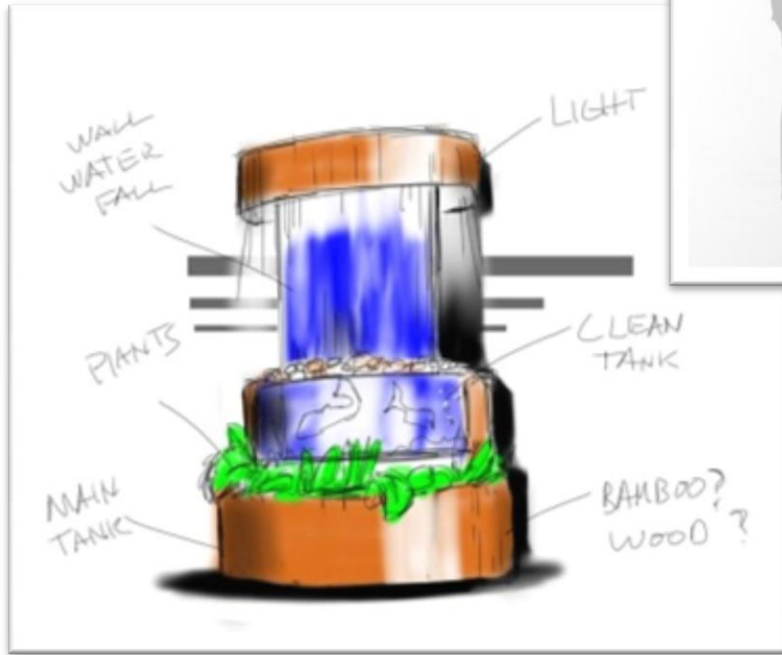
- **Aesthetic**
- **Marketable**
- **User friendly**
- **Allow for meal size fish**
- **Focal point**



Conceptual Design



Conceptual Design cont.



Top Three Final ideas

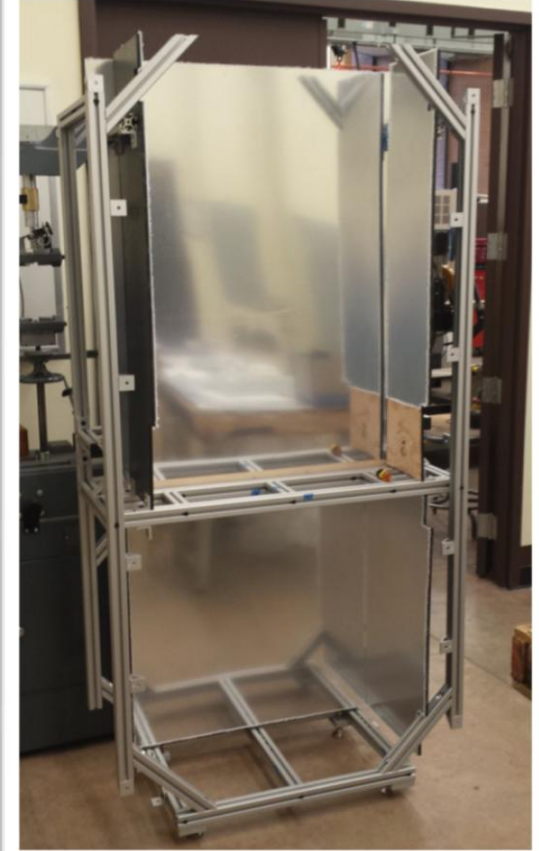


Final Design

Render vs Prototype



Fabrication



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Fabrication cont.

- **Outsourcing:**
 - Sheet metal cutting
 - Aluminum cutting (discounts)
- **Students did everything else themselves at school**



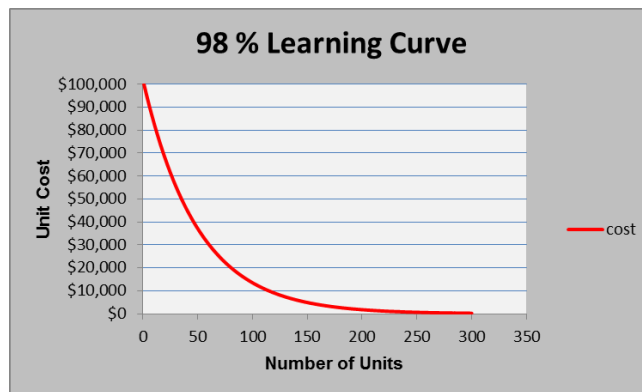
Electronics

- **Components**
 - **Grow Lights**
 - **Accent Lighting**
 - **Pumps**
 - **Compressor**
 - **Tank level Indicators**



Budget

- Build cost: \$10,000
- Actual total cost: \$8,187.31
- Hours to make: 1000 hours approximately
- Overhead Rate: \$91.00/hour
 - Prototype cost in industry
\$101,000.00 plus design cost
- Cost for unit 300 = \$238



PROJECT COST	
assembly	UNIT PRICE
Frame	\$ 882.54
Plastic Sheets	\$ 1,228.77
weld-on #4 & 40	\$ 132.22
Fish Tank	\$ 714.87
Bubble Wall	\$ 800.95
wood Panels and paint	\$ 169.27
SS Shell Panels & Sheets	\$ 629.27
Heating Strip	\$ 284.49
Float switch's	\$ 84.65
Connection fitting	\$ 40.91
single flute EM	\$ 72.49
air compressor	\$ 30.00
Water Pump	\$ 70.00
Grow Media	\$ 74.39
Bio Media	\$ 40.00
Float Valve	\$ 35.68
Valves & Connectors	\$ 119.30
Bubble Wall Parts	\$ 50.08
Power cord	\$ 46.65
LED flex strip	\$ 81.19
LED grow light	\$ 111.00
Ultra flex	\$ 39.89
Channel relay	\$ 59.96
Mouser	\$ 458.67
Box & Cables	\$ 91.72
Mouser	\$ 228.14
Tank LED Lights	\$ 81.19
Cash Misc.	\$ 551.29
Shipping supplies	\$ 132.21
R&D misc.	\$ 23.25
Team Shirts	\$ 222.27
Presentation Room	\$ 600.00
SUB TOTAL	\$ 8,187.31
Budget	\$10,000.00
Budget Leftover	\$ 1,812.69



Satisfaction!

- **Presentation at the East Meets West Aquaponics Symposium on May 10th at University of Hawaii**
- **The unit was shipped to Hong Kong**
 - **Office at Science and Technology Parks**



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What we learned

- **First senior project in the department that dealt with a company internationally**
 - We were lost
 - Everything was new
- **International agreement (contracts to sign)**
 - Involving school lawyers
- **IP (intellectual property)**
 - We don't claim any
 - Publication is allowed as long as we let them know
- **Shipping**
 - Inexpensive way



Next time

- **Go through Office of Sponsored Projects**
 - Extra fees
 - Negotiation
 - Accountants and etc.
- **Claim some IP for school benefit**
- **Decide details**
 - Who is paying what and how and when
 - Left-over budget: pay back or keep?
 - Specific dates for little things



Q&A



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