

# Lesson 1: Introduction to Hydroponics & Aquaponics

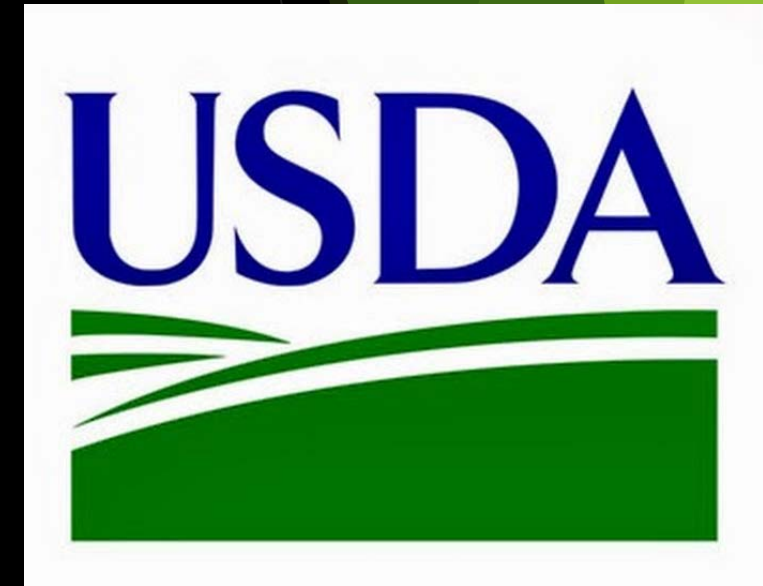
Dr. Roy Weitzell & Morgan Livingston



Hydroponics & Aquaponics Workshop Series for Veterans & Military  
*Sponsored by USDA Specialty Crop Block Grant AM190100XXXXG019*

# Hydroponics & Aquaponics Workshop Series for Veterans & Military

- ▶ Origin of the course
- ▶ Course Format
- ▶ Specialty Crop Block Grant funding
- ▶ Organizational partnerships



# Morgan Livingston, MSW

- ▶ 5<sup>th</sup> Generation farmer, Mahoning Creek Farm
  - ▶ PA Century Farm, Preserved Farm
  - ▶ Diversified livestock operation(hogs, Angus cattle, sheep, chickens)
  - ▶ Direct-market meats & value-added products at local farmers' markets
- ▶ Agricultural Innovation Manager, The Farm @GWCFB
  - ▶ Manage organic orchard, field production, raised beds, ag-education initiatives
  - ▶ Hydroponic & greenhouse production managed by Mike Smetak, Hydroponics & Greenhouse Program Director
- ▶ PA Farm Bureau, Main Street Farmers' Market Board, PA Ag Business Development Center Advisory Board
- ▶ Master's in Social Work, social work/non-profit experience





# Allison Yeckel

- ▶ Allison is a 2005 graduate of the University of Pittsburgh in Mechanical Engineering and Chatham University in Mathematics. She has professional experience working for the Department of Defense, the renewable energy sector and public education. She currently serves in the US Air Force Reserves as an Officer in the Civil Engineer Squadron at the 911th Airlift Wing in Pittsburgh, PA.
- ▶ Allison also serves her community by volunteering as the Emergency Management Coordinator for Somerset Township, PA and also volunteers as the Safety and Procedures Manager for Finleyville Airport (G05).
- ▶ Allison founded Mission Homestead, a 501(c)3, in late 2016 in order to introduce military members and their families to home based trade skills, including welding, carpentry, auto mechanics and agriculture. Mission Homestead also serves as a platform to introduce homeschooled children to the vocational trades.





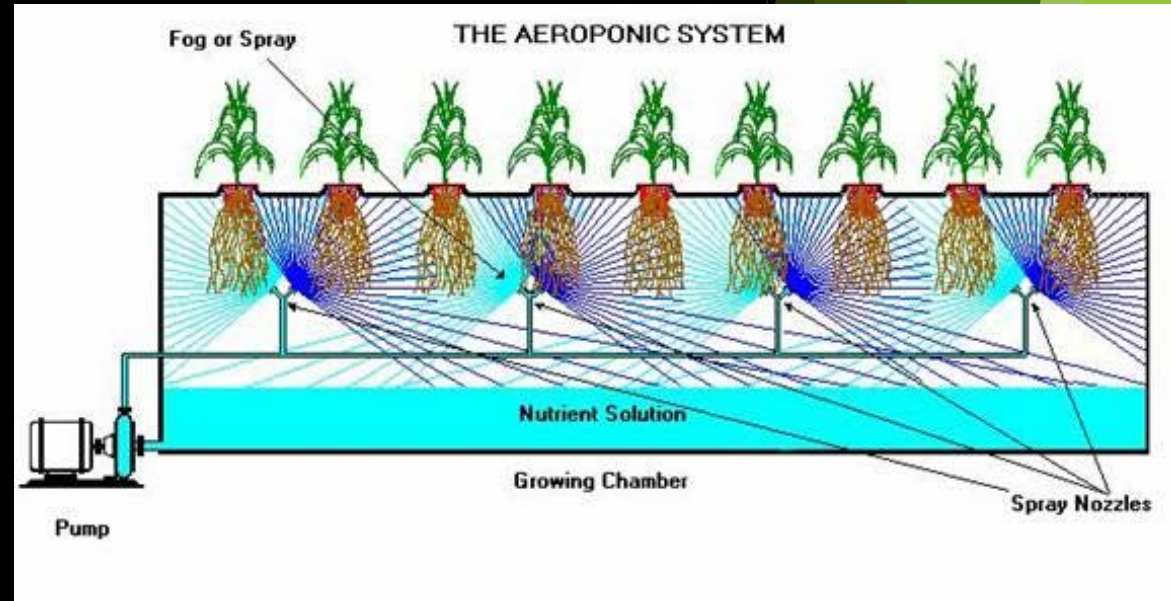
# What do you hope to gain from the course?





# Definition of Hydroponics:

- ▶ Takes place in growing medium vs. soil
- ▶ Nutrient delivery via water
- ▶ Often (but not always) in a controlled environment
  - ▶ Control variables
  - ▶ Extended growing season
  - ▶ Useful in places with limited arable soil
- ▶ Aeroponics:
  - ▶ No grow media
  - ▶ Roots absorb nutrients/water via nutrient mist/vapor





# History of Hydroponics

- ▶ Historical documentation:
  - ▶ Hanging gardens of Babylon
  - ▶ Floating gardens of the Aztecs
- ▶ 1860 “Nutriculture” :
  - ▶ German researchers, Sachs & Knop
  - ▶ documented that plants could be grown in water containing macronutrients
- ▶ 1925-1935: Interest from commercial greenhouse industry
  - ▶ W.F. Gericke, University of California: commercial-scale experiments
  - ▶ Coined the term “hydroponics”
- ▶ 1940’s: US Military hydroponics projects in the Pacific
  - ▶ Used to grow food for the troops
  - ▶ Large project in Japan continued after WWII





# Development of Commercial Hydroponics

- ▶ 1950's: Commercial use expands
  - ▶ Aided by cheaper, higher quality plastics & electronics
- ▶ Present day: commercial use is wide spread
  - ▶ Automation/robotics
  - ▶ Alternative energy
  - ▶ Extensive use in North America, Holland
  - ▶ Applications in space





# What are the benefits of growing hydroponically?

- ▶ Control the environment
  - ▶ Weed & pest control
  - ▶ Extended growing season
  - ▶ Nutrient delivery
  - ▶ Grow in places you normally couldn't
- ▶ Conservation of water & inputs
- ▶ Freshness of product if managed & harvested properly
- ▶ Increased yields & shorter crop maturation cycle
  - ▶ 4-10 times increased yield for hydroponic tomatoes
- ▶ Cultivate more plants in a smaller space (limited only by available light)



# Recommended Resources:

- ▶ Hydroponic Food Production, 7th Edition., Howard M. Resh
- ▶ <https://www.htgsupply.com/informationcenter/>
- ▶ <https://www.youtube.com/user/CropKingInc/videos>
- ▶ <https://www.youtube.com/user/BrightAgrotechLLC/videos>
- ▶ <https://www.youtube.com/user/mhpgardener/playlists>



# Sources

- ▶ <http://chickenscratchbc.blogspot.com/2013/11/hanging-gardens-of-babylon-did-they.html> (Image)
- ▶ <http://hydroponicgardening.com/history-of-hydroponics/the-birth-of-hydroponics/> (Image)
- ▶ <https://lerablog.org/home-and-family/gardening/hydroponics-greenhouses-grow-bigger-and-better-with-no-soil/> (Image)
- ▶ <http://pinecrestgardenguy.blogspot.com/2011/03/tantalizing-prospects-of-hydroponics-i.html> (Image)
- ▶ <https://www.rimolgreenhouses.com/greenhouse-series> (Image)
- ▶ <http://gardenclub.homedepot.com/grow-year-round-hydroponic-garden/> (Image)
- ▶ <https://www.pinterest.com/pgta/hydroponic-display-gardens/> (Image)