

# WALL-E

Yini Wang; Ran Mo





# Development Team

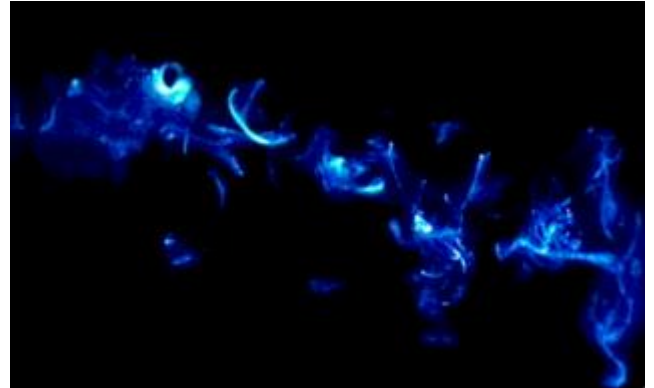
Yini Wang: Photomultiplier Tube & Machine Learning

Ran Mo: Video Processing & Machine Learning



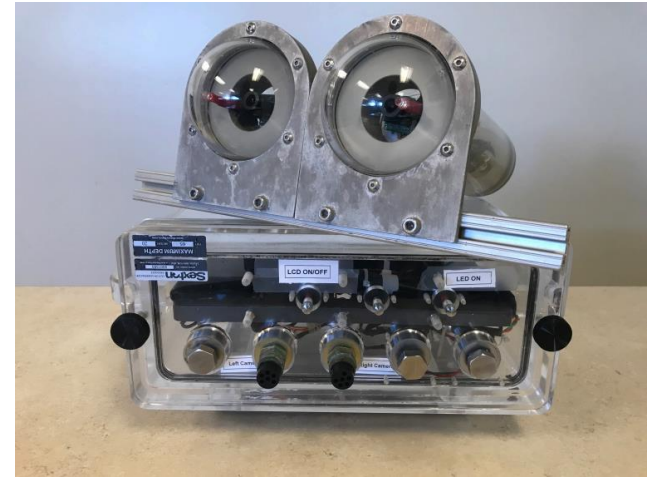
# Problem Specification

- Study cypridinid ostracods
- Record videos of the bioluminescence
- Record light levels with extreme precision
- Recognize species



## Previous WALL-E

- Watec Camera
- Frame Synchronizing
- Create 3D map of ostracod light pulses



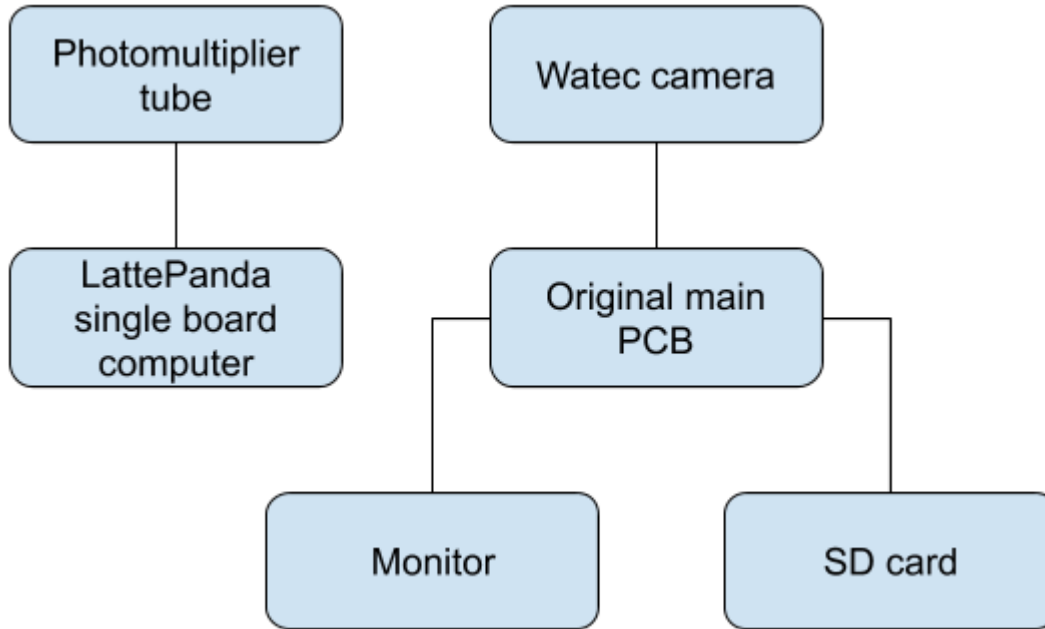


# Proposed Solutions

- Use PhotoMultiplier Tube (PMT) to record overall light levels
- Collect data from Watec Cameras
- Post processing the recorded videos (de-noising, convert to RGB)
- Build a neural network to recognize cypridinid ostracods



# Block Diagram





# PhotoMultiplier Tube (PMT)

## Hamamatsu H11890-210

- I/O interface: USB Port
- Power supply: single board computer
- Spectral response: 230 to 700 nm
- Effective area diameter: 8 mm





# LattePanda computer (Windows 10)

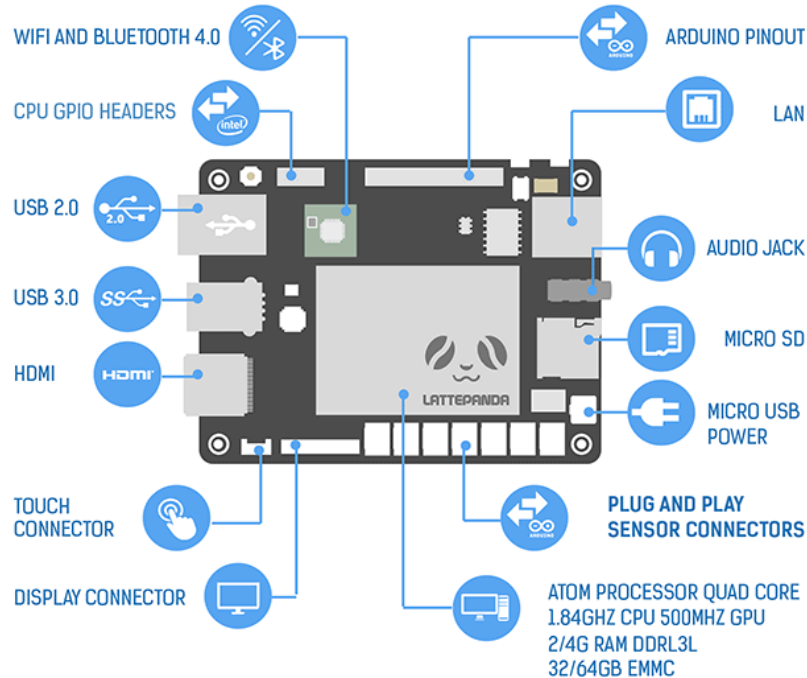
## LattePanda single board computer V1.0

- Processor: Intel Cherry Trail Z8359 Quad Core Processor
- Base Frequency: 1.44 GHz (1.92 GHz Burst Frequency)
- Operating System: Windows 10 Home Edition
- RAM: 2GB
- Storage Capacity: 32GB
- Power Supply: 5V@2A





# LattePanda computer (Windows 10)





# Current Progress

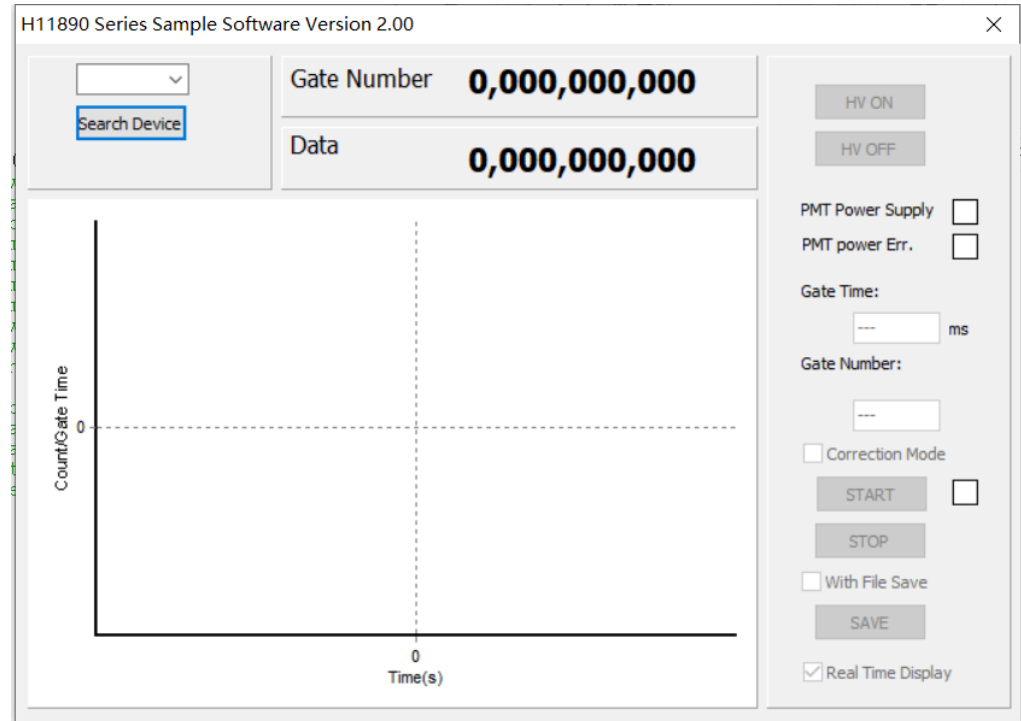
- Control Hamamatsu software to automatically complete the whole recording process and save the data as .txt file
- Denoise the recorded videos
- Convert the grayscale denoised videos into RGB
- Find the periods of signals occurred in the denoised videos



# PhotoMultiplier Tube (PMT)



- Hamamatsu Software
- UI Automation



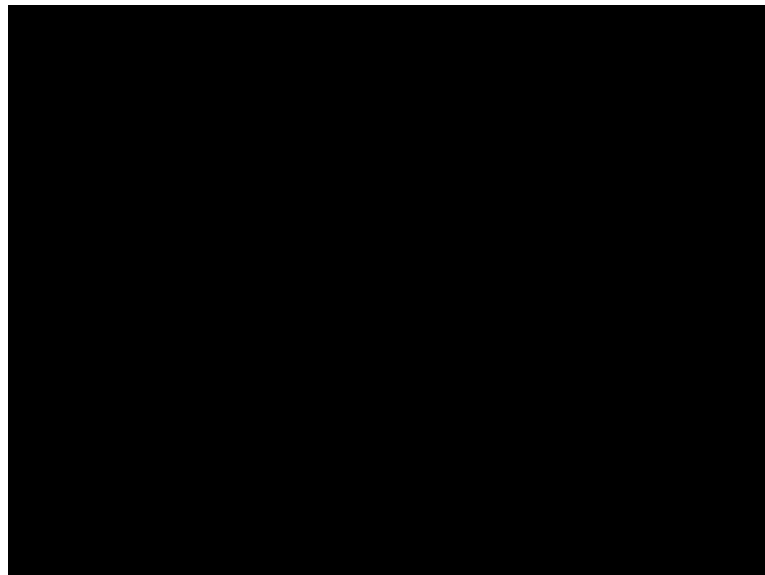
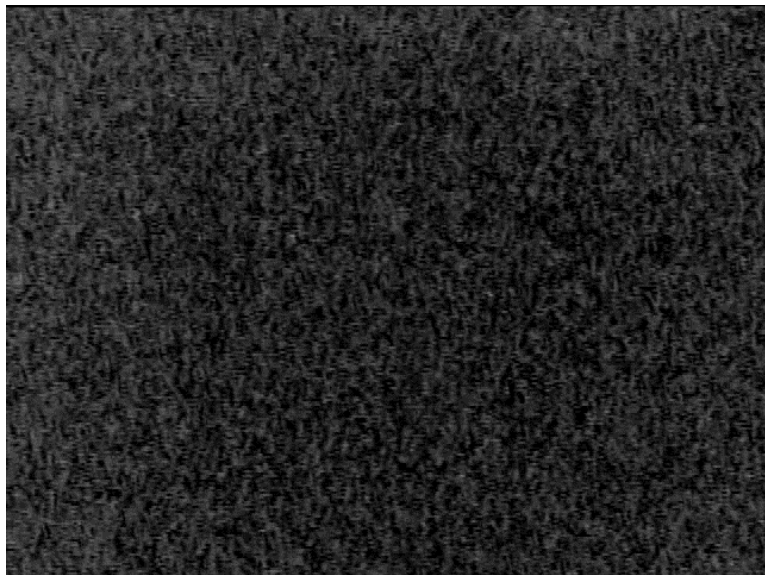
# PhotoMultiplier Tube (PMT)



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h: 0  SupportedPattern: LegacyIAccessiblePattern
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垂直滚动条  Handle: 0x0(0)  Depth: 3  RangeValuePattern.Value: 0.0  SupportedPattern: LegacyIAccessiblePattern RangeValuePattern
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02)  Depth: 2  SupportedPattern: LegacyIAccessiblePattern
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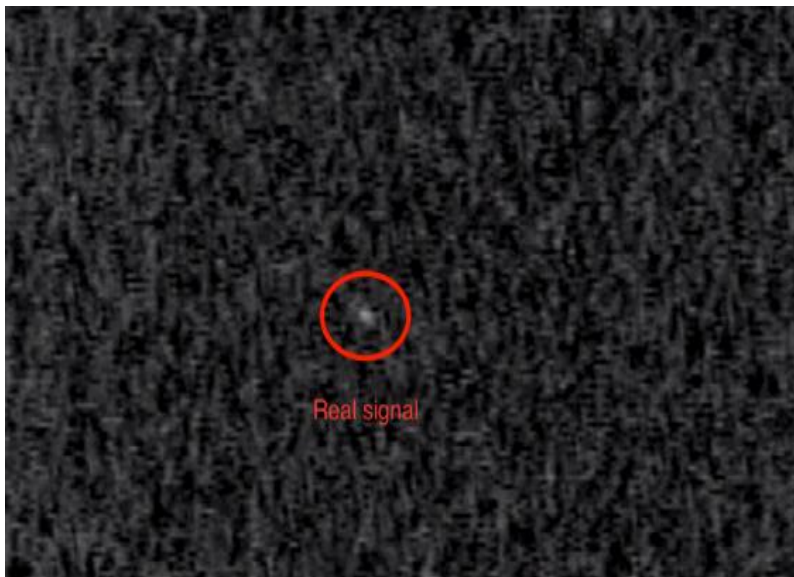


# Denoise

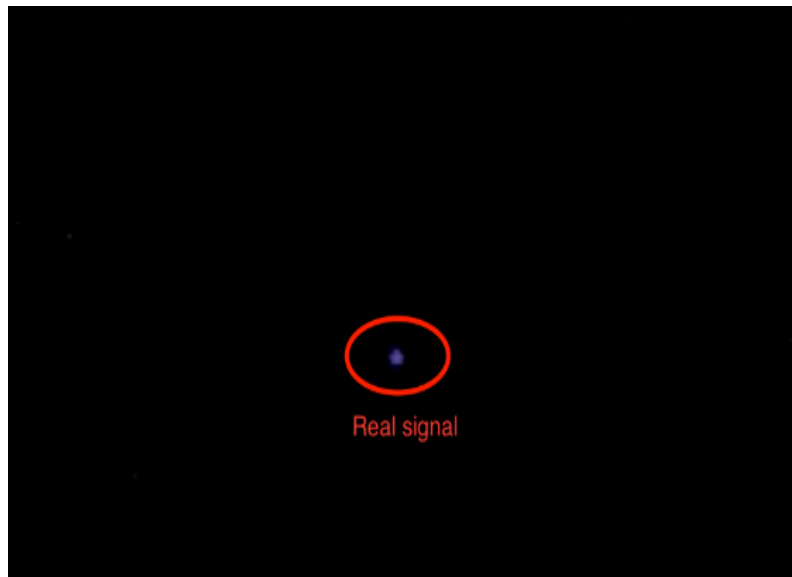




# Denoise



Before denoise



After denoise



# Acknowledgement

## Oakley Lab:

- Prof. Oakley
- Emily Lau
- Niko Hensley

## UCSB Capstone

- Prof. Yogananda
- Kyle Douglas
- Aditya Wadaskar

# Thanks!

Questions?