An aerial satellite image of a city, likely Manila, showing a mix of urban and green spaces. The image is overlaid with a semi-transparent dark grey rectangle containing white text. Additionally, there are green rectangular overlays on various buildings and areas across the image, and blue lines tracing roads and boundaries. A red line forms a circular pattern around a central intersection.

# Masking changes in land cover in multi-resolution satellite images

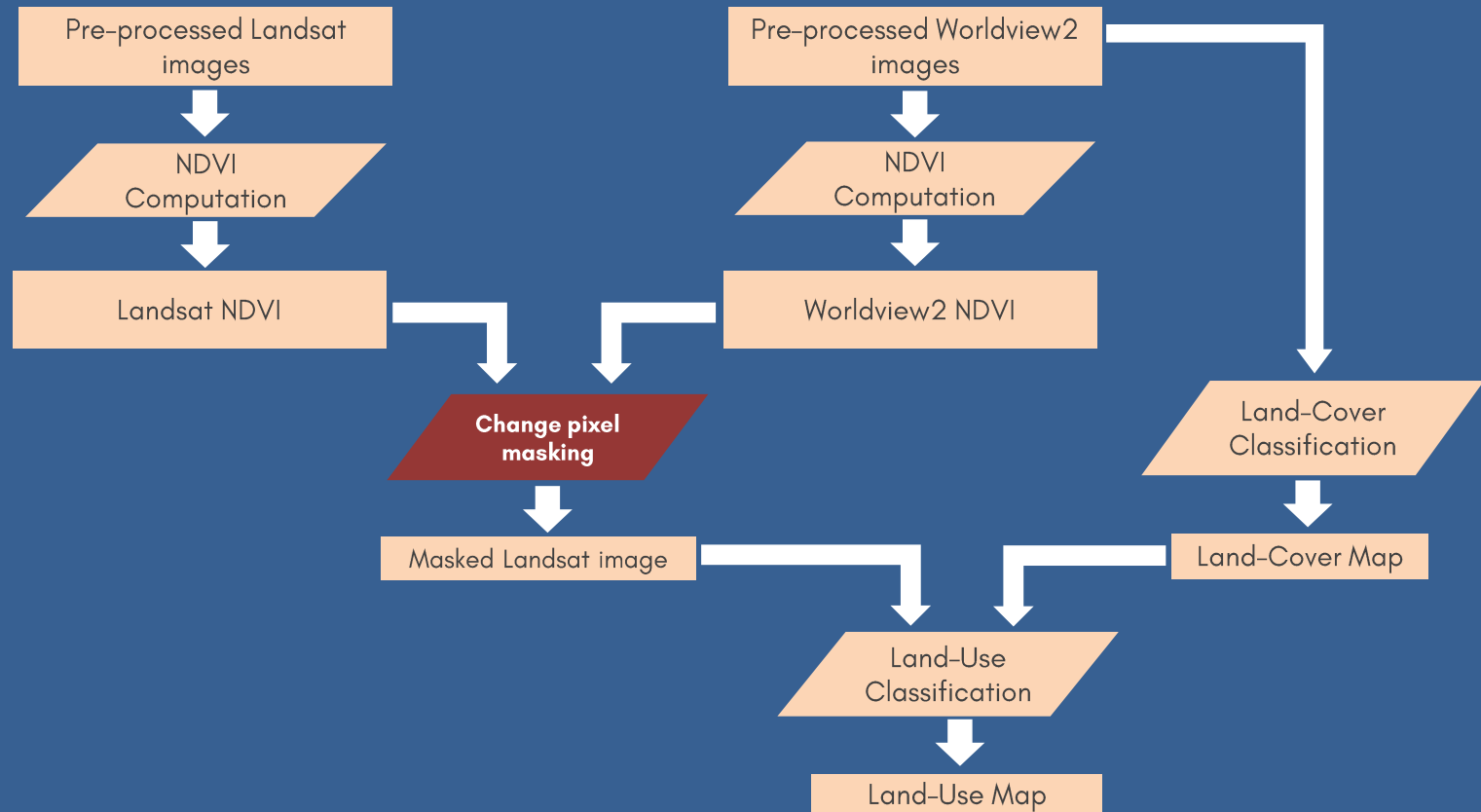
Presenter: **Gab Torres**

Github id: <https://github.com/tropicalmentat>

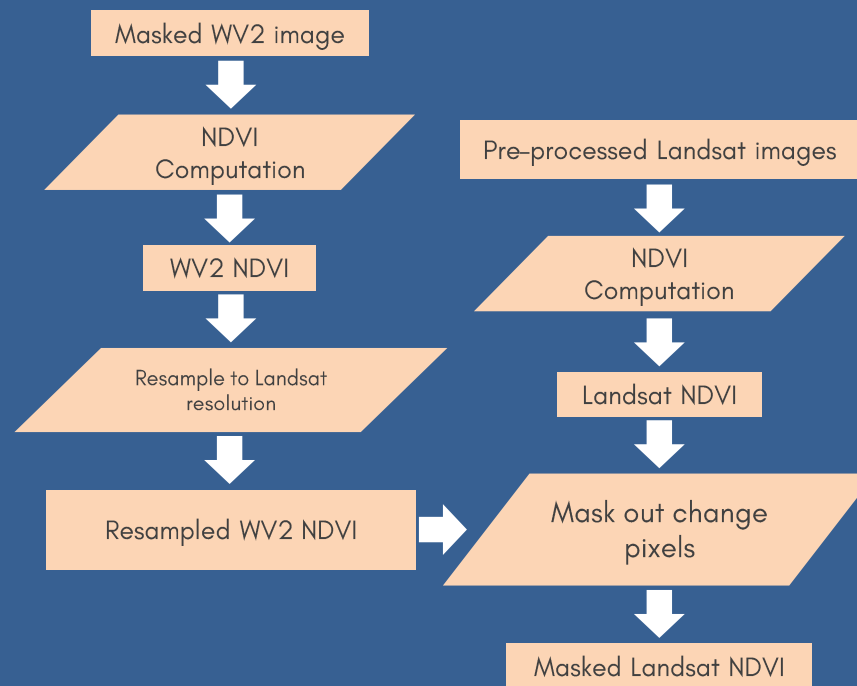
Master of Science in Geography | UP Diliman

Remote Sensing and Geographic Information Systems  
Technologist | Manila Observatory, Ateneo de Manila

# General Work-Flow



# NDVI Computation and Change Pixel Masking



NDVI:  
**N**ormalized  
**D**ifference  
**V**egetation  
**I**ndex

# Inputs

## Worldview2

Panchromatic resolution: 0.46m

4 standard multispectral bands (red, green, blue, near infrared)

## Landsat 8

Multispectral resolution: 30m

8 multispectral bands

For NDVI computation, I am only interested in bands 3 and 4 of both sensors!



Worldview2





A satellite image from Landsat 8 showing a landscape with a grid of colored pixels. The image is overlaid with several colored lines: a red line running diagonally from the top left to the middle right; a green line running diagonally from the top right to the bottom right; a yellow line forming a large polygon in the center-left; and a blue line forming a smaller polygon on the left. The colors of the pixels represent different land cover types, with greens indicating vegetation, browns and tans indicating bare soil or water, and blues indicating water bodies.

**Landsat 8**

**Where are the changes in land cover between these two images?**

## **Modules used:**

**GDAL** – **G**eospatial **D**ata **A**bstraction **L**ibrary

**Sci-kit image** – For image processing

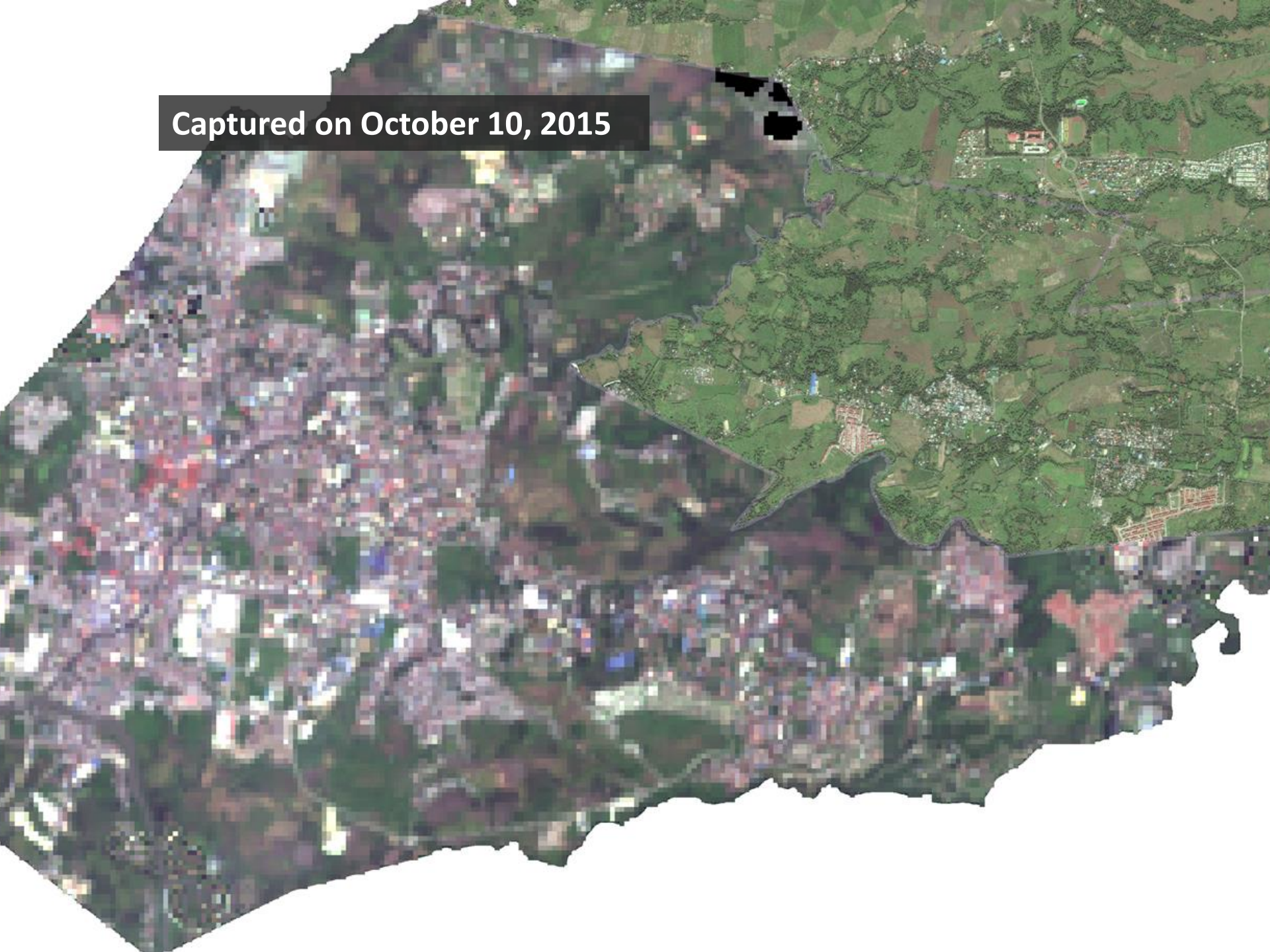
**Scipy** – For linear regression

**Numpy** – For handling image-arrays

**Random** – For random sampling of pixels



Captured on October 10, 2015





Captured on December 24,  
2015

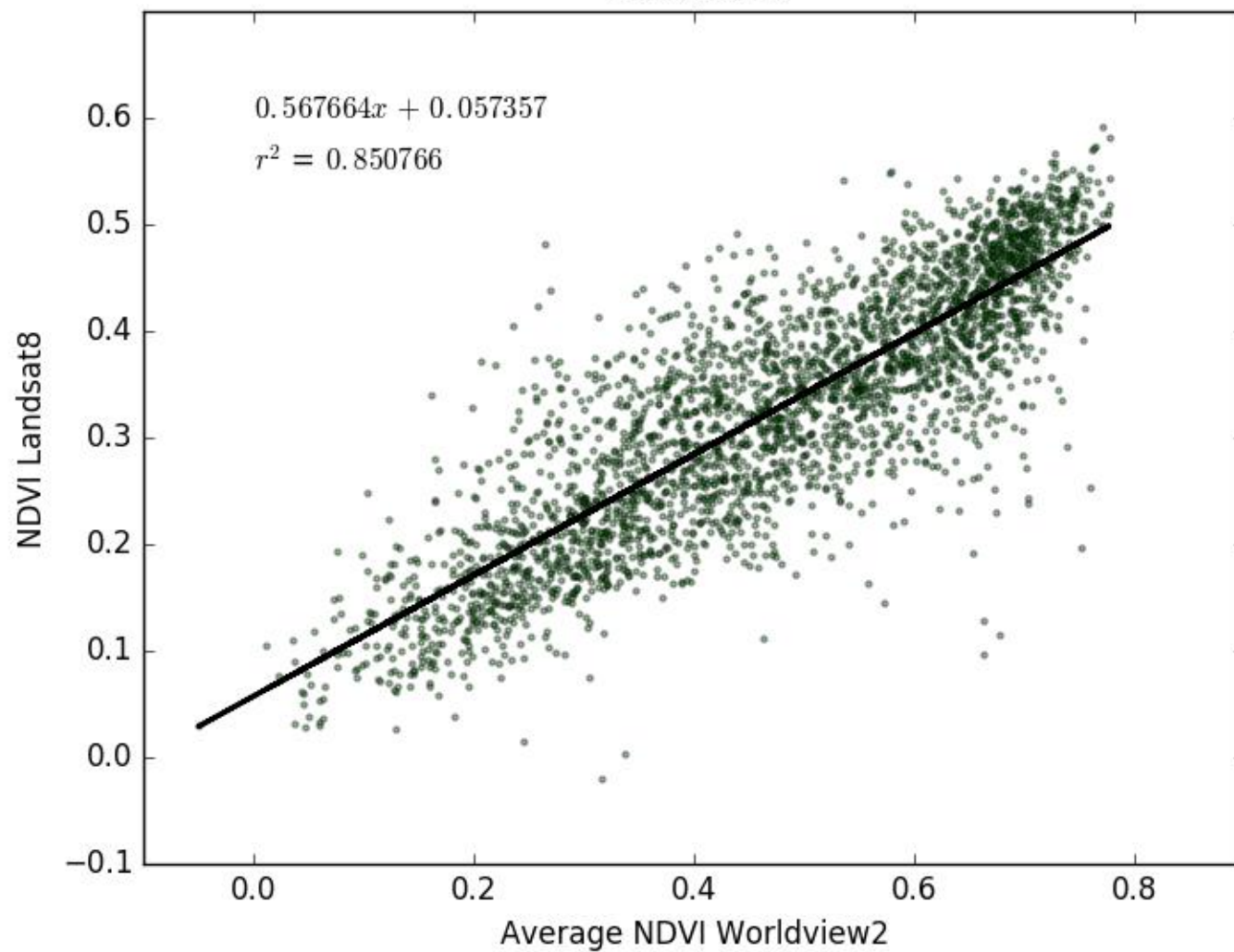


**Pixels in multi-resolution images are correlated.**

**Can be modelled using linear regression.**



### Iteration 3













**Changes in land cover occurred in agricultural areas**

This satellite image shows a coastal city with a large urban area on the left and agricultural fields on the right. A winding river or canal is visible. Six yellow rectangular boxes highlight specific areas of land cover change: two in the top-left agricultural region, one in the top-center, one in the center-right agricultural region, one in the bottom-left near the water, and one in the bottom-center. A text box in the top-right corner states 'Changes in land cover occurred in agricultural areas', and another text box in the center-right states 'Also detected urban expansion!'.

**Also detected urban expansion!**

Repository link:  
[https://github.com/tropicalmentat/the-sis-project-scripts/blob/master/mask-change-pixels/temporal\\_filter.py](https://github.com/tropicalmentat/the-sis-project-scripts/blob/master/mask-change-pixels/temporal_filter.py)







An aerial photograph of a geographical area. On the left, a river winds through a densely populated urban area. To the right of the river is a large, dark green body of water, likely a lake. The land is a mix of urban development, green fields, and some bare patches. A semi-transparent dark grey box is centered over the image, containing the text 'THANK YOU! 😊'.

**THANK YOU! 😊**