Project title: Characterization of Tropical Wetlands Ecosystems in Peru

Description: Tropical palm swamp wetland ecosystems form in tropical rainforests where conditions of seasonal flooding are moderate and the land surface remains consistently inundated. The combination of permanently saturated soils, year-round warm temperatures, and low oxygen levels in the palm swamp soils can lead to a large carbon release to the atmosphere, particularly as methane (CH_4) gas. Methane has a warming potential as a greenhouse gas that is 23 times higher than that of CO_2. However, little is known concerning the contribution of carbon emissions from palm swamps and scarce information exists about the location and expanse of these ecosystems.

In this project, students will build on previous work to map palm swamps of the Pacaya-Samiria National Reserve in Peru using high resolution NASA UAVSAR airborne imaging radar data to map these important biomes. Students will utilize land cover maps in combination with the remote sensing datasets, in a classification and analysis construct. Students will focus on the digitization of these regional maps and assess the agreement of vegetation cover derived from the radar observations. Students will be introduced to concepts of imaging radar and polarimetric decomposition of scattering mechanisms for delineation of different land cover classes.

Skills we expect the students to develop include:
- GIS skills including: digitization, shapefile creation, raster analysis, map presentation, using open-source software (Quantum GIS)
- Basic introduction to statistical tools using MATLAB or Python
- Basic introduction to imaging radar including concepts of backscatter and polarization.
- Communication skills (through weekly presentations)

Supervising Professor: Dr. Kyle McDonald
PhD Student Mentor: Kat Jensen