SilvaCarbon Workshop: Monitoring Land Use Change with Remote Sensing in Support of Carbon Reporting

August 6-17, Boston University, Room 435
685 Commonwealth Avenue, Boston, MA 02215

Primary Instructors:

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Overall Approach: Each day there will be lectures in the morning on topics forming the background for the image processing steps used during the workshop. These lectures will be followed by demonstrations of the image processing steps involved in mapping and monitoring land cover and land use. There will be an assignment each day that will use the demonstrated methods on an image of choice from those brought from EROS. The assignments build toward the production of a land cover map for the area of interest as well as monitoring of land cover change. Note that special attention will be paid to methods of accuracy assessment and area estimation. At the end of the workshop, each participant will provide a brief presentation of the results of their efforts during the workshop. At 3:00pm each day there will be an "extra" lecture on the results of current or past research projects in our lab that are intended to provide context and examples of successful applications of remote sensing.

Daily Schedule

Day 1 - *Lecture:* The nature of optical images; radiation properties and measurement; General Concepts; image data and formats (Curtis)
Assignment: select Landsat images for assignments; introduction to computing environment at BU – accounts, lab, geo; image display and enhancement in ENVI
3:00 Extra: Carbon Budgets and Land Use Change – (Pontus)

Day 2 - *Lecture:* Observations, Calibration, Atmospheric Correction – and radiometric units (Curtis)
Assignment – radiometric units and image processing (atmospheric correction and its effect on image data)
3:00 Extra – Global Land Cover Validation (Curtis)

Day 3 - *Lecture:* Clouds and Cloud Shadows (Zhe)
Assignment: Cloud and Cloud Shadow Detection with Fmask, and use of masks in image analysis
3:00 Extra: Urban Growth in China (Curtis)

Day 4 – *Lecture*: Image Compositing (Curtis)
Assignment: Image Compositing
3:00 Extra: Agricultural Expansion in Turkey and Effects on Hydrology (Curtis)

Day 5 – *Lecture:* Image Classification – strategies, methods, algorithms (Curtis)
Assignment: Land cover classification (make a land cover map)
3:00 Extra: Assessment of the spectral, polarimetric, temporal and spatial dimensions for urban and peri-urban land cover classification using Landsat and SAR data (Zhe)

Day 6 – *Lecture:* Change Detection (Curtis)
Assignment: Change Detection (make a land cover change map)
3:00 Extra: Large area monitoring of Forest Change (Curtis)

Day 7 – *Lecture:* Image Segmentation (Curtis)
Assignment: Image Segmentation
3:00 Extra: Forest Mapping and Neural Networks (Curtis)

Day 8 – *Lecture:* Accuracy Assessment and Area Estimation (Pontus)
Assignment: Accuracy Assessment and Area Estimation
3:00 Extra: Continuous Forest Monitoring (Zhe)

Day 9 – Day 4 – *Lecture:* Multispectral Transforms – NDVI, PCA, Tassled Cap; and Spectral Mixture Analysis (Curtis)
Assignment: Finish Land Cover Change Maps and Accuracy Assessment
3:00 Extra: Monitoring Forest Mortality (Curtis)

Day 10 – Complete Projects: Downloading software – and Participant Presentations