

# Annual Report

Submitted to Oregon State University

**Title:** Model to Separate Water Column Chlorophyll and Benthic Vegetation Signals from HICO Data

**PI:** Hyun Jung Cho, Ph.D., Associate Professor, Integrated Environmental Science, Bethune-Cookman University, Daytona Beach, FL 32114 USA, Phone: 1-386-481-2793; Fax: 1-386-481-2659; Email: [choh@cookman.edu](mailto:choh@cookman.edu)

**Co-PI:** Deepak Mishra, Ph.D., Assistant Professor, Department of Geography, University of Georgia, Athens, GA 30602, Phone: 1-706-542-8927; Fax: 1-706-542-2388; Email: [dmishra@uga.edu](mailto:dmishra@uga.edu)

## Summary of your work

We requested Level 2 HICO images that cover southern Mosquito Lagoon, Northern Indian River Lagoon (IRL), and Banana River Lagoon, centered at (Lat: 28.568844, Long: -80.757854; Fig. 1) during four different times over a one year period. We proposed to combine our existing models and to calibrate the new model to HICO data in order to develop a protocol to map benthic seagrass beds because the previous chlorophyll mapping methods (MERIS and Landsat TM) that were used for the IRL system were not appropriate to distinguish phytoplankton signals from those of benthic seagrass beds'.

We have received one L2 image that was obtained March 2013 and currently awaiting to receive three additional L2 images (Oct 2013, two in February 2014). Concurrent field trips were made whenever the weather conditions and boats were available to collect ground-truth data. The March 2013 data were used to develop algorithms to better distinguish macroalgae from vascular seagrass; and the manuscript is not accepted and in press for a publication in *GIScience and Remote Sensing* for a special issue of March 2014.

## Other Relevant Accomplishments and Project Outputs

### Additional Leveraging Funding Received

1. Cho, H.J. HICO Satellite Data Model for Seagrass Mapping in Indian River Lagoon, FL. \$25,000. *Florida Space Grant Consortium* 8/15/2013 – 8/14/2013.

### Peer Reviewed Journal Papers

1. Cho, H.J., I. Ogashawara, D. Mishra, J. White, A. Kameronosky, L. Morris, A. Simpson, D. Banisakher, (In Press) Evaluation of Hyperspectral Imager for the Coastal Ocean (HICO) data for Seagrass Mapping in Indian River Lagoon, FL *GIScience and RS*

### Peer Reviewed Proceeding Papers

2. Cho, H.J., D. Mishra, C. Clarke, and A. Kameronosky. 2013. Hyperspectral signal bands to HICO image data bands for seagrass mapping. *Proceedings of the 2013 IEEE WHISPER* (the 5<sup>th</sup> Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing. 25-28 June 2013. 4pp. Gainesville, FL, USA

### Presentations and Abstracts at Scientific Meetings (\* indicates student presenters)

1. Ali Simpson\*, Hyun Jung Cho, and Lori Morris. 2014. Assessment of Benthic Mapping using Hydroacoustic, Aerial, and Satellite Sensor Data. Annual meeting of Association of American Geography, April 8-12, 2014. Tampa, FL

2. Deya Banisakher\*, Hyun Jung Cho, Deepak Mishra, Lori Morris. 2014. Benthic habitat mapping in the Indian River Lagoon, Florida using Hyperspectral Imager for the Coastal Ocean. Annual meeting of Association of American Geography, April 8-12, 2014. Tampa, FL
3. Ali Simpson\*, Hyun Jung Cho, and Lori Morris. 2014. Benthic Mapping using Hydroacoustic, Aerial, and Satellite Sensor Data. 2014 Indian River Lagoon Symposium. Feb 6-7, 2014. Harbour Branch, FL
4. Deya Banisakher\*, Hyun Jung Cho, Deepak Mishra, Lori Morris. 2014. Benthic Habitat Mapping in the Indian River Lagoon, Florida using Hyperspectral Imager for the Coastal Ocean. 2014 Indian River Lagoon Symposium. Feb 6-7, 2014. Harbour Branch, FL
5. Philip Bellamy\* and H.J. Cho. 2014. Water Correction Model for Improved Benthic Mapping. 2014 Indian River Lagoon Symposium. Feb 6-7, 2014. Harbour Branch, FL
6. Cho, H.J. 2013. Hyperspectral benthic mapping of Estuarine Environment. Oct 18<sup>th</sup>, 2013. Boca Raton, FL (invited seminar at the Florida Atlantic University)
7. Cho, H.J. 2013. Remote Sensing of Benthic Habitats. Oct 10<sup>th</sup>, 2013. Palatka, FL (invited seminar at the St. Johns River Water Management District)
8. Deya Banisakher\*, Hyun Jung Cho, Joseph White\*, Ali Simpson\*. 2013. Seagrass mapping in Indian River Lagoon, FL using Hyperspectral Imager for the Coastal Ocean. The 14<sup>th</sup> Annual Conference of Minority Access, September 27-29, 2013, Washington, D.C.
9. Cho, H.J., D. Mishra, C. Clarke, and A. Kameronosky. 2013. Hyperspectral Signal Bands to HICO Image Data Bands for Seagrass Mapping. The 5<sup>th</sup> Workshop on Hyperspectral Image and Signal Publications and Presentations, and electronic copies of any publications or presentations that we can post on the HICO website.