AGENDA FOR CAPE TOWN WORKSHOP

[Workshop GitHub Repo]

In-person contributors:
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Workshop support:
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SAAO

Day 1 (Wed 9 Oct): BioSCape Airborne and Field Data in the Cloud			
Time	**Mins**	**Topic**	**Instructor**
08:00 - 08:30	30 min	Registration, Connect to WiFi, Coffee & Tea	
08:30 - 08:35	5 min	Talk: Welcome • Introductions • Review of agenda and code of conduct	Anabelle Cardoso
08:35 - 08:55	20 min	Talk: BioSCape Overview + Q&A • Remote sensing and airborne campaigns • BioSCape's research objectives • Imaging spectroscopy and lidar • Open Science	Anabelle Cardoso
08:55 - 09:05	10 min	Talk: NASA Earthdata • What are the NASA DAACs • Data discovery and access	Michele Thornton
09:05 - 09:25	20 min	Exercise: Earthdata Search • Login • Search • Direct Access / Download	Michele Thornton & Rupesh Shrestha
09:25 - 09:40	15 min	Talk: The BioSCape Cloud + Q&A • What is the SMCE • What is JupyterHub • What is GitHub • Questions	Michele Thornton
09:40 - 10:30	50 min	Exercise: JupyterHub basics • Opening the SMCE • Making your own folder • Loading a Python environment • Pulling GitHub repo • Running a notebook	Michele Thornton & Rupesh Shrestha
10:30 - 11:00	30 min	Break	
11:00 - 11:25	25 min	Talk: BioSCape Airborne Data • Introduce the 4 instruments and their satellite	Anabelle Cardoso

		analogues ○ AVIRIS-NG and EMIT/PACE ○ PRISM and PACE/EMIT ○ HyTES and ECOSTRESS ○ LVIS and GEDI ● Review campaign con ops ● Introduce the L3 mosaicked data product ● Introduce the BRDF/Geo adjusted data product ● Exercise: MMGIS/Visions platform - Adding a coordinate and looking at the surrounding tiles	
11:25 - 11:55	30 min	Talk: Highly dimensional imaging spectroscopy data ● Overview of *xarray* and the ANG data model	Glenn Moncrieff
11:55 - 12:15	20 min	Q&A	All Instructors
12:15 - 13:15	1 hr	Lunch	
13:15 - 13:30	15 min	Talk: BioSCape Field Data ● Vegetation plots ● Review of other field data ● Where to find the field data	Anabelle Cardoso
13:30 - 14:30	60 min	Notebook: AVIRIS-NG and the BioSCape field data ● Import, subset, and view data using *pandas* and QGIS ● Extract spectra for lat/long coordinates of vegetation plots	Michele Thornton & Rupesh Shrestha
14:30 - 14:45	15 min	Notebook (non-participatory example): PRISM ● Import, subset, and view data	Michele Thornton & Rupesh Shrestha
14:45 - 15:15	30 min	Break	
15:15 - 15:30	15 min	Talk: LVIS and GEDI for post-fire vegetation growth ● LVIS and GEDI full waveform lidar data ● How wet and dry sites differ during burn recovery	Jasper Slingsby
15:30 - 16:30	60 min	Notebook: LVIS and GEDI for post-fire vegetation growth ● Import, subset, and view data ● Estimate post-fire age from vegetation height using historical fire data, LVIS, and GEDI	Rupesh Shrestha
16:30 - 17:00	30 min	Q&A	All Instructors
Day 2 (Thur 10 Oct): Remote Sensing for Biodiversity Applications			
Time	**Mins**	**Topic**	**Instructor**
08:00 - 08:30	30 min	Coffee & Tea	
08:30 - 08:45	15 min	Talk: HyTES and ECOSTRESS data ● What can thermal data tell us about biodiversity?	Presenter TBC (Kerry to provide slides)
08:45 - 09:45	60 min	Notebook: HyTES and ECOSTRESS data ● Open and view LST from HyTES ● Open and view ET from ECOSTRESS ● Review of other ECOSTRESS L3 products	Michele Thornton & Rupesh Shrestha
09:45 - 10:00	15 min	Talk: PRISM, PACE, and ECOSTRESS for aquatic biodiversity ● What are turbidity and chlorophyll and why do they	Erin Hestir

		matter ● What does ocean color and sea surface temperature tell us about biodiversity	
10:00 - 10:30	30 min	Break	
10:30 - 11:30	60 min	Notebook: PRISM, PACE, and ECOSTRESS for aquatic biodiversity ● Calculate turbidity and chlorophyll on a PRISM scene ● Calculate turbidity and chlorophyll on a co-located PACE scene ● Relate ECOSTRESS sea surface temperature metrics to chlorophyll	Erin Hestir
11:30 - 11:50	20 min	Talk: AVIRIS-NG for spectral diversity ● What is spectral diversity and what can it tell us ● Different ways to calculate spectral diversity including intrinsic dimensionality	Henry Frye
11:50 - 12:50	60 min	Notebook: AVIRIS-NG for spectral diversity ● Calculate the intrinsic dimensionality of an AVIRIS-NG scene	Henry Frye & Phil Townsend
12:50 - 13:50	1 hr	Lunch	
13:50 - 14:10	20 min	Talk: AVIRIS-NG and EMIT for mapping alien trees ● Complexities of mapping aliens and why imaging spectroscopy helps ● Machine learning approaches for mapping invasive plants	Glenn Moncrieff
14:10 -15:00	50 min	Notebook: EMIT for mapping alien trees ● Access EMIT data over S3 from EarthAccess ● Inspect spectra of native and invasive vegetation	Glenn Moncrieff
15:00 - 15:30	30min	Break	
15:30 - 16:30	60 min	Notebook: AVIRIS-NG for mapping alien trees ● Map common alien tree species using a machine learning classifier	Glenn Moncrieff
16:30 - 17:00	30 min	Q&A	All Instructors
Day 3 (Fri 11 Oct): Mapping Plant Functional Traits			
Time	**Mins**	**Topic**	**Instructor**
08:00 - 08:30	30 min	Coffee & Tea	
08:30 - 09:00	30min	Talk: AVIRIS-NG and field data to explore functional traits ● Spectroscopy for plant traits	Phil Townsend & Henry Frye
09:00 - 10:00	60min	Notebook: AVIRIS-NG and field data to explore functional traits ● Relational joins of composition data, airborne spectral data, and trait data (provided). ● Calculating community weighted trait means ● Visualizing plot-level spectra and calculating two band vegetation indices. ● Calculating vector-normalized spectra	Henry Frye & Phil Townsend

10:00 - 10:30	30min	Group Photo	
10:30 - 10:50	20min	Talk: ● Demo of a Partial Least Squares Regression (PLSR) and its outputs ● Demo of a json file containing PLSR coefficients	Phil Townsend & Henry Frye
10:50 - 11:50	60min	Notebook: ● Apply PLSR coefficients to AVIRIS-NG tiles to produce trait map ● Compare predicted trait values against observed plot variables. ● Open trait maps in QGIS and compare results with intrinsic dimensionality	Henry Frye & Phil Townsend
11:50 - 12:20	30min	Q & A	All Instructors
12:20 - 12:40	20min	Complete feedback survey	
12:40 - 13:30	50min	Lunch + Goodbye	