

SPECIALISTS IN GEOSPATIAL ANALYSIS AND REMOTE SENSING FOR MAPPING AND MODELING SURFACE WATER DYNAMICS

The Geospatial Analysis for Environmental Change Laboratory (GAEC), a research organization dedicated to integrating ecological research with remotely sensed information.

Our group of geospatial scientists work on quantifying space time patterns of environmental change using remote sensing, spatial analysis and graph theory at sub-continental to continental scale.

RESOURCE BASE

Our lab utilises

- A specialised team of experienced scientists, academics & researchers
- Access to high performance computing facilities for processing of large quantities of satellite imagery
- Internally developed methods and algorithms for time-series analysis for tracking of feature dynamics through space and time
- Experience with multiple sensor types and platforms, with the requisite field experience to produce useful information



OUR CAPABILITIES

Our lab focuses on change detection in large scale environments, mapping surface characteristics and dynamics from a combination of data sources.

We apply remote sensing techniques, geographical information software packages and spatial statistics to a variety of ecological mapping challenges. This gives us the edge in researching and understanding the cause and effect balances of these complex systems at a larger scale that cannot be achieved with field studies alone.

Further by utilising our own algorithms and processing

techniques to extract information from archived aerial images, we can develop models of these systems through time including their interactions with specific environmental conditions.



CURRENT PROJECTS AND PARTNERS

GAEC is currently working with the Australian Research Council in partnership with the Murray Darling Basin Authority and several other leading researchers. Our focus on the response of vegetation to environmental change; specifically how the flooding dynamics of the Murray Darling Basin (MDB) impact vegetated environments, aims to quantify surface water resources and assess the impact of multiple drivers of change in the region.

This has been achieved through mapping and subsequent network/graph theory analysis of

surface water in the MDB, on a regional scale. From this, new techniques utilising full-waveform LiDAR data and hyperspectral imagery were then used in the largest river-red gum forest in Australia, along the floodplain of the Murray River, to delineate individual tree species and complex crown and trunk structures.

ARC Linkage Project with MDB Authority

A novel approach for assessing environmental flows using satellite data.

ARC Discover: Early Career Research Award

Water resources in a changing climate: The impact of climate and land use change on surface water dynamics and connectivity.



Valentin Heimhuber

PHD student interested in hydrology and Earth systems, flood modelling and Geospatial analysis.



Iurii Shendryk

PHD student focusing on multi-platform remote sensing techniques.

THE TEAM



Dr Mirela Tulbure

ARC DECRA fellow and lead geospatial analyst for GEAC, Mirela focuses on the integration of remote sensing techniques driving informed management and policy decisions.



Dr Mark Broich

Research fellow at UNSW, Mark specialises in large scale environmental mapping and spatial-temporal dynamics with change

detection, previously working on deforestation rate assessments for Indonesia and Borneo.



Robbi Bishop Taylor

PHD Student focusing on landscape ecology and environmental connectivity.

Surface water extent dynamics from three decades of seasonally continuous Landsat time series at subcontinental scale in a semi-arid region.

