## Letter from the Director

As new trends arise in technology, we continue to discover exciting opportunities to bolster our understanding of how the world works and how different decisions may affect our future. The emerging Data Science field is captivating researchers across both academics and the private sector as it provides a powerful, accessible, and reproducible methodology to analyze, visualize, and communicate findings from the large and growing datasets that become more accessible each day.

One of our primary goals at the GIF is to provide people with the best of what's emerging in the world of technology in ways that can be used to help our understanding of the enormous environmental and social challenges confronting us all. With the understanding that space, place, and time are the most basic elements that unify disparate data sets, we aim to develop a new generation of researchers that understand not only the technology and tools to address these challenges, but also the geographic concepts that bind them. Spatial Data Science.

This newsletter highlights some of the tools and events our growing staff are helping to develop in order to promote Spatial Data Science in support of global challenges. I encourage you to experiment with these new resources to help us discover their full potential.

- Kevin Koy
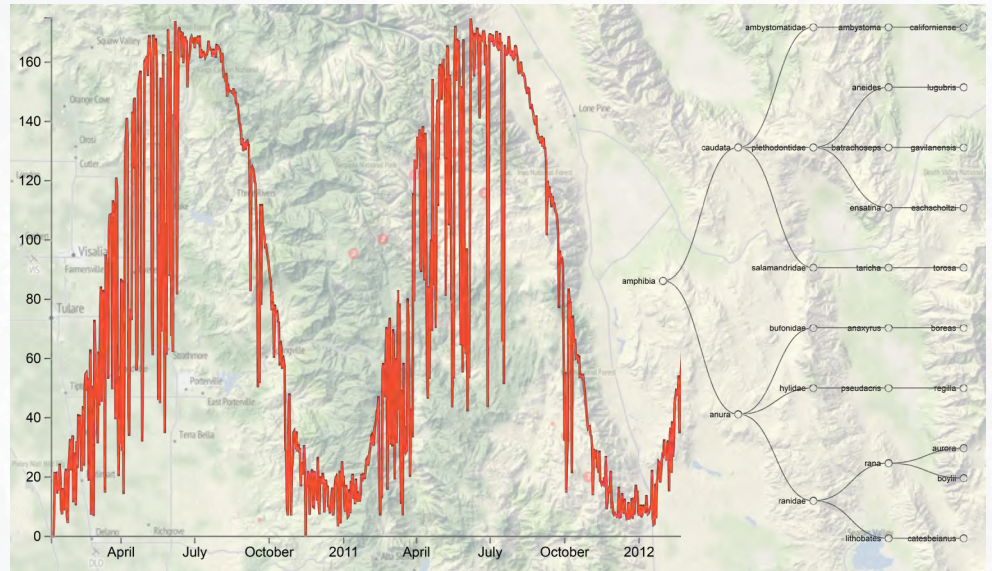
Visualization examples of data accessed via the Holos API including a taxonomic chart of amphibian species seen in the Hastings reserve (gray), a map plotting geolocated historic landscape photo from the VTM dataset, and a line chart plotting solar radiation as collected by a sensor in the Angelo Reserve (orange).

Holos
Berkeley Ecoinformatics Engine

Initiated with funding from the W. M. Keck Foundation. Holos is being designed to enable the cross-disciplinary exploration of data required to understand biotic response to global change. This exploration is enabled by new technologies to make large datasets accessible for rapid search, analysis, and visualization online. The Holos infrastructure is based on an open-access Application Programming Interface (API) that allows for flexible development of analytic and integrative tools.

We base our approach on the understanding that the data being served is the most important part of this effort. Thus, the primary goal of the project is to enable the data to be made as accessible as possible in easily generalizable and open formats so that they may continue to be utilized in the years to come.

Holos currently hosts a variety of data sets including several million geolocated museum specimen observations, sensor measurements and species checklists from UC field stations, as well as vegetation survey results and landscape photos from the Wieslander Vegetation Type Mapping surveys conducted by USGS in the 1920s-1940s. Access the data via the Ecoengine API in geojson and csv formats at:
http://ecoengine.berkeley.edu/api/

Spatial Data Science
Leveraging modern analytical tools to move beyond desktop GIS

Data science is a relatively new idea that describes a collection of methods and tools that have been developed to better understand and communicate findings to complex questions. Desktop GIS users have worked for many years to hone skills that are essential to this field such as acquiring and formatting data, querying and analyzing data, and visualizing data to display meaningful stories. What's changing rapidly, however, are the tools and methods that make these skills open and replicable. Rather than being limited to desktop software accessed through a Graphical User Interface (GUI) a suite of powerful tools are developing around coding platforms.

In the coming months, we will be organizing a series of Spatial Data Science events and workshops with the hopes of engaging both geospatial specialists, to incorporate these new skills into their workflows, as well as developers that are already using these techniques but are interested to better understand spatial data. Specific data science tools will come and go as the technology rapidly changes, thus the focus of these events are not to teach a specific suite of tools, but rather to teach a user how to quickly get up to speed in whatever the new tools may be, all using common standard programming practices.

Additionally, the GIF currently develops three web applications in Holos (as seen in the previous page), Cal-Adapt (http://cal-adapt.org), and Landcarbon (http://landcarbon.org). Each of these efforts have been built using open sources tools and methods that are common to data science, including Python, Django, and PostGIS. We are now in the process of publishing open API's that will allow programmatic access to all of these resources, beyond what is capable via their websites.

We welcome users to work with the data available via API to build your own visualization and analysis tools. As these resources grow, and new tools are developed, we will host a gallery where applications can be explored, and where code can be viewed and leveraged to make new tools.

Upcoming Events

Workshops
GIF workshops offer hands-on applications oriented training in a variety of geospatial topics. The Fall 2013 workshop agenda is available at:
http://gif.berkeley.edu/support/workshops.html.

Geospatial courses being offered include:
- Intro to GIS, GPS, Remote Sensing
- Land cover change analysis
- Object Based Image Analysis
- Intro to Open-Source GIS
- Intro to WebGIS
- Intro to Species Modeling

Geolunch
Thursday's 1:10 - 2PM
Join us in Mulford 103 for another series of fantastic spatially based presentations and discussions. Speakers this Fall come from a wide variety of expertise including spatial applications in computer science, econometrics, mobile development, biology, art, and data science.

Geolunch details are available at:
http://gif.berkeley.edu/about/geolunch.html

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GIS Day
Wednesday, November 20
GIS Day is provides an international forum for users of geographic information systems (GIS) technology to demonstrate real-world applications that are making a difference in our society.

GISday

Stay tuned for details on the upcoming event to be hosted in Mulford Hall including presetnations, posters, and networking oportunities.

http://gif.berkeley.edu