Resurrecting Yesterday’s Landscapes
Using historic aerial imagery and Google Earth to visualize change

Problem:
Historic vertical aerial photographs, while rich in content for analysis, are pretty boring to look at.

Merge in Photoshop
Combining multiple images into a mosaic provides a larger canvas on which to work, and eliminates the need to georeference frames individually.

Georeference and compare to current data
Contemporary data, such as the location of oil wells (left), and new subdivisions (right), on top of 1930’s landscapes visually emphasize land use and re-use.

Import to Google Earth Pro and compose a scene
Google recently made its professional edition of Earth available for free. Google Earth Pro accepts geotiff’s and exports much higher resolution still images than its earlier free counterpart.

All black and white images created by Randy Stoll, Kern County, which operated in California from 1937 until 1949. The black and white imagery includes the largest and most comprehensive collection of historic mapping and photography in an academic library.

This poster demonstrates how multiple images can be combined into a mosaic to provide a larger canvas on which to examine land-use data.
Since 2010, rapid urbanization in China has propelled the transformation of the surrounding landscape at an unprecedented rate. Near the city of Yan’an, in Shaanxi Province, 20.186 square kilometers of mountainous terrain has been flattened and cleared for the purpose of constructing industrial parks. Anthropogenic geomorphological processes have been working at phenomenal rates to prepare mountains for their industrious future. However, this $16 Billion project was initiated without a scientific inquiry into the viability of the terraforming venture. These practices are causing notable impacts on the air and water quality of the region as well increasing the frequency in landslides.

Crop Evapotranspiration and Change in Irrigation in Kern County

This study is estimating water expenditure based on ETc, precipitation, and land-use map data in Kern County, before and during the recent California drought. Nine focus crops were selected by largest crop area from Kern County agricultural land polygons and evaluated for their evapotranspiration values with inclusion of soil types. Crop Evapotranspiration (ETc) is the sum amount of water (in inches) that evaporates from the soil and transpires from plants in a given area of farmland. This value is unique to each crop and varies with both environmental conditions (e.g., precipitation, humidity, and temperature) as well as agricultural conditions (e.g., irrigation and soil type). In the past decade, California has experienced drought conditions that have caused variations in precipitation year categorization (2006 being a typical year, 2010 being a wet year, and the recent 2014 being a dry year). Looking at these three year types in accordance with ETc values can give us a reasonable estimation of the change in irrigation needed to sustain crop growth. With these visualizations, it is possible to assess which locations and major crop types are excessively demanding during California’s water crisis.
Neighborhood Boundary Representations: Koreatown, Los Angeles

Crystal Bae
Department of Geography, University of California, Santa Barbara

This poster explores where residents in and near the officially designated neighborhood of Koreatown, Los Angeles, locate the boundaries of "Koreatown" as well as how these boundaries are similar or different from other boundary definitions, and why? Further, it explores which physical and social factors relate to the residents' understanding of these boundaries and how cognitive neighborhood boundaries relate to residents' ethnic identity, their activities within this space, and their level of identification with Koreatown.

Using Social Media to Predict the 2016 Elections

Nhi Chung, Hans Marasigan, Richard Ko
Department of Geography, University of California, Santa Barbara

Using Java programming language and Twitter to gather geotagged Twitter data for four weeks, the authors compared their data with polls, sentimental analysis, flow maps, network graphs, temporal trends, and spatial visualization to make predictions for the 2016 elections.
Testing Core Spatial Computations
Sara Lafia
Department of Geography, University of California, Santa Barbara

Existent solutions for translating a traditional GIS workflow into a set of core computations that extend across domains are explored.

In two intervention studies, concrete and virtual models were examined for their support when teaching diagram translation in chemistry, important to developing representational competence. Translation accuracy was compared over time for three groups that differed on the type of model (Concrete, Virtual, or none) used to give intervention feedback. Concrete models were manipulated directly by hand but virtual models employed either a lower-fidelity (mouse and keyboard) interface (Study 1) or a higher-fidelity (co-located 3DOF prop with stereo-display) interface (Study 2). In both studies, the two model groups were not significantly different, but the combined model group was significantly more accurate than the control group, which was provided with feedback but without models. Also, the model group was more accurate than the control when tested 7 days later without models. These results show that manipulative models can scaffold learning but that interface fidelity is not essential in this learning task.

Developing Representational Competence with Concrete and Virtual Manipulatives in Chemistry
Andrew T. Stull and Mary Hegarty
Department of Geography, University of California, Santa Barbara

Abstract
In two intervention studies, concrete and virtual models were examined for their support when teaching diagram translation in chemistry, important to developing representational competence. Translation accuracy was compared over time for three groups that differed on the type of model (Concrete, Virtual, or none) used to give intervention feedback. Concrete models were manipulated directly by hand but virtual models employed either a lower-fidelity (mouse and keyboard) interface (Study 1) or a higher-fidelity (co-located 3DOF prop with stereo-display) interface (Study 2). In both studies, the two model groups were not significantly different, but the combined model group was significantly more accurate than the control group, which was provided with feedback but without models. Also, the model group was more accurate than the control when tested 7 days later without models. These results show that manipulative models can scaffold learning but that interface fidelity is not essential in this learning task.
Soil Erosion Modeling Using the Revised Universal Soil Loss Equation (RUSLE) in the Sedgwick Reserve

Scott Yehl

Department of Geography, University of California, Santa Barbara

Modeling soil properties in a landscape is difficult because of their wide-ranging, three-dimensional variability. However, using topological and hydrological data analyses of digital elevation models (DEMs) that take the heterogeneities of soil landscapes into account, certain characteristics of soil media within a specified watershed can be predicted. Using geographic information systems as a platform, attributes of a DEM can be calculated and combined to describe spatial variability in landscape properties, such as soil erosion. This project examines the well-studied soils of the Sedgwick Reserve in order to determine annual soil loss distributed across the landscape. The RUSLE model for soil erosion is employed in this analysis.
This poster explores the dynamics and value of Interactive Information Systems, which are largely based on awareness and trust.

Metadata Topic Harmonization and Semantic Search for Linked-Data-Driven Geoportals
Yingjie Hu, Krzysztof Janowicz, Sathya Prasad, and Song Gao
STKO Lab, Department of Geography, University of California, Santa Barbara

Geoportals provide integrated access to geospatial resources, and enable both authorities and the general public to contribute and share data and services. An essential goal of geoportals is to facilitate the discovery of the available resources, which relies heavily on the quality of metadata. While multiple metadata standards have been established, data contributors may adopt different standards when sharing their data via the same geoportal. This is especially the case for user-generated content where various terms and topics can be introduced to describe similar datasets. While this heterogeneity provides a wealth of perspectives, it also complicates resource discovery. The problems addressed in this project are: (1) Heterogeneity in metadata topics, whereby different data providers may contribute data to the same geoportal using different metadata standards; and (2) the lack of semantic search for RDF metadata, whereby search is based on keyword matching instead of the meaning of the input query.
Measuring the Effects of the March 2011 Japanese Tsunami using Landsat 5 Imagery

Dominick Burnham, Ben Schock, and Dana Tuttle
Department of Geography, University of California, Santa Barbara

The 2011 9.0-magnitude Tohoku earthquake on northeastern Honshu Island, Japan, caused large tsunamis to hit the northeast coastal regions of the Island and flow into urban areas, ultimately causing immense infrastructural damage. This project examined the tsunami-related land-cover change in the areas surrounding Hirota Bay, Yamada Bay, and Motoyoshi Bay and created a classification system to quantify land-cover change to serve as an accurate model of land-cover change caused by tsunami.

Populations near Active Oil Wells in Kern County, CA

Ben Schock, Colin Loustalot, and Clark Shao
Department of Geography, University of California, Santa Barbara

The locations of oil extraction wells were investigated for the counties with the highest production of oil in California—Kern County (that has 77% of California’s active wells) and Los Angeles County. The goal of this project was to assess the distribution and relationships between extraction well sites and the populations and places, including ethnic communities, those of low socioeconomic status, and K-12 schools.
Street light improvements are systematically installed in certain parts of Isla Vista as it grows in both population density and crime rate. A student group project conducted in 2012 found very little association between street lighting and crime occurrences; however, it serves as a great comparison to the current lighting conditions for this current project. The goal of this project is to provide a student's perspective to the upcoming improvements as well as assessing the current effectiveness and coverage of Isla Vista street lights. Analysis of the luminosity, intensity, and cost of lights, is expected to help understand and suggest improvements for this college town’s night life conditions.

Astronomy Learning in Digital Virtual Environments
Pilot Study: Desk Top Immersive Environment

Jatila van der Veen
(Physics Department and U.S. Planck Team)

Jessica Cornick and Jim Blascovich
(UCSB Department of Psychological and Brain Sciences)

Luke Spooner and Hannah Kang
(Physics Department, Undergraduate Research Assistants)

The objective of this pilot study was to establish a baseline of students at the University of California, Santa Barbara who use the Virtual Solar System simulation in a desk-top virtual environment (DVE), which will be compared to a similar population who use the simulation in a fully immersive virtual environment (IVE) with head-mounted displays. Target questions addressed were: (1) Does navigating in a virtual solar system improve learners’ spatial comprehension in astronomy, compared to a reference group who experienced only traditional, lecture-based instruction? (2) Does increasing the level of immersion from DVE to IVE improve spatial learning in basic astronomy? (3) What role does a student’s prior knowledge and experience play in learning spatial concepts in astronomy in virtual environments.
Spatial Ability in Expert Geoscientists
Margaret R. Tarampi, Kinnari Atit, Heather L. Petcovic, Thomas F. Shipley, & Mary Hegarty

This project explores if expert geoscientists have high spatial ability in (a) cross-sectioning (spatial reasoning about internal structures based on surface information); (b) spatial perspective taking (mentally transforming one’s perspective relative to spatial forms); (c) environmental spatial ability (large scale spatial ability); and (d) spatial visualization (small scale spatial ability).

Why is that Property Shaped the Way it is?
Telling the History of Thousand Oaks with Searchable Tract Maps
Helen Johnson
City of Thousand Oaks

The City of Thousand Oaks has a public facing online map service accessible to residents and businesses interested in better understanding the city. One of its many features is a search tool for individual properties which allows users to retrieve information on ownership, assessment, zoning, and links to Public Works drawings including tract maps. Currently, tract maps are only available for modern developments that have a standardized naming structure. Older developments with no regular naming structure are not accurately linked to from the online map. This project aims to compile tract map data into a single feature class that can link each parcel to all of its historic tract maps. This will allow the online map to link to tract maps from every parcel. In addition to links to the current tract maps, each parcel will also have links to all previous maps. This will help owners understand how and when property boundaries came to be. The objective of this project is to create a more useful, streamlined map service and to improve data access to the public.