

Spring Meeting Schedule

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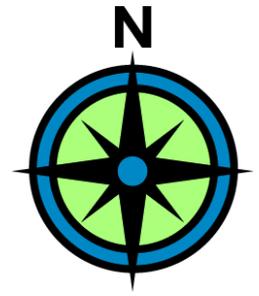
[Map the Presentations!](#)

Tuesday, May 22, 2012, from 8:00 AM until 5:00 PM

[Smith College](#)

[Campus Center](#)

[Map it: 72° 38' 19.38" W, 42° 19' 9.93" N](#)



8:00 – 9:00 Registration & Refreshments

Campus Center Atrium (Second Floor)

\$40 in advance – \$50 after 8 – Current Students \$20

9:00 – 10:15 Session 1

Campus Center Carroll Room 208

Welcome and Opening Remarks

Stu Rich, NEARC President

PenBay Solutions

Jon Caris, Spatial Analysis Lab

Smith College

Keynote Address — ArcGIS 10.1

Tom Schwartzman

Esri

ArcGIS 10.1 is the next release of Esri's GIS platform. New desktop features include dynamic legends, edit tracking, sophisticated analysis, and continued integration of Python. Desktop is also more tightly integrated with Server, providing a wizard-based tool for map publishing. ArcGIS Server will provide support for 64-bit hardware, cloud based-infrastructure, and a simpler administrative model. Imagery and LiDAR enhancements will be discussed, as well as the new ArcGIS Runtime.

10:15 – 10:30 Refreshment Break and Poster Session

Campus Center Atrium and Lounge (Second Floor)

10:30 – 12:00 Session 2

GIS Technics

Campus Center Carroll Room 208
Moderator: Andy Anderson

Planning

Campus Center Room 103/104
Moderator: Jon Caris

Landscapes

Campus Center Room 205
Moderator: Andy Kuether

Census Workshop Option 1

Sabin Reed Hall Room 104
Coordinator: Jon Caris

◆ 10:30

Mastering Spatial Analyst (by Thinking Like a Worm)

Dana Tomlin
University of Pennsylvania

The world of pixels differs from that of points, lines, and polygons in ways that may have less to do with those data types themselves than the mind's eyes of their users. This presentation argues that point from the perspective of one who has now spent well over three decades pitching raster-based GIS tools and techniques to graduate students at Harvard, Penn, Yale, and Ohio State.

Supporting a Culture of Planning with Web GIS Technology: A Case Study for the "Master Plan Explorer" Web App

Niels la Cour
Campus Planning, University of Massachusetts Amherst
Alexander Stepanov,
GIS Architect
University of Massachusetts Amherst, A&F Administrative Systems

The University of Massachusetts Campus Planning division is striving to integrate spatial thinking and technology into its efforts to develop the Campus Master Plan and establish a culture of planning at UMass Amherst. The Master Plan, being a long-term strategic vision of Campus physical development is being designed via a planning process which cultivates public participation and is data intensive. To make the process effective, transparent, and inclusive, Campus Planning group developed a web based "Master

Measuring Forest Biomass Using AIMS LiDAR and Aerial High-resolution Imagery

Danelle Laflower, Thomas Millette, and Eugenio Marcano
Mount Holyoke College

Increasing atmospheric carbon dioxide (CO₂) levels are a leading cause of climate change (Malhi et al. 2002). Most terrestrial carbon is stored in forest biomass (Olson et al. 1985) by the photosynthetic conversion of atmospheric CO₂. Therefore, estimating carbon stocks helps us quantify CO₂ concentrations. Ecologists calculate biomass with empirical allometric equations that use species and diameter at breast height (dbh) and divide by two to estimate carbon (Brown and Schroeder 1999, Jenkins et al. 2004).

I hypothesized that I could estimate stand-level biomass using the Airborne Imaging Multispectral Sensor's (AIMS) high-resolution

Census Data and Spatial Applications: Transforming Census Data into Maps

Michael Howser
University of Connecticut Libraries Map and Geographic Information Center (MAGIC)
Steven Batt
University of Connecticut Libraries
Jie Lin and Jonathan Pollak
University of Connecticut Department of Geography

Do you need to use Census data for mapping projects and have limited time? This workshop will highlight how to locate census data using the New American FactFinder and transforming this data into geospatial friendly formats. Join us as we remove the frustration from mapping census data during this hands-on workshop as we locate, download, and transform census data into geospatial friendly formats.

developed a web-based "Forest Plan Explorer" application to visualize proposed ideas and to solicit feedback and comments from the public and campus community. The solution relies on GIS web services and utilizes ready-to-use customizable templates for web-applications. The presentation will cover our approach in establishing the back end and front end of the application using ArcGIS Server, JavaScript Web API, and customizable templates.

imagery and LiDAR height measurements. To test this notion, I selected a study area on Mount Holyoke College property, in South Hadley, Massachusetts and systematically sampled 366 trees for species, height, dbh, and canopy data. I obtained LiDAR-derived canopy height and high resolution imagery with the AIMS system. I averaged the LiDAR values and the sampled trees' heights within each plot to obtain plot average height for each method. By dividing the area into 20 plots, a linear regression indicated that the LiDAR average height was a significant predictor of dominant tree average height ($p=0.000$, $R^2=0.638$).

For the remote biomass estimation, in each subplot I identified species and stem density in georeferenced AIMS images. From ground data, I created linear regression models to estimate dbh from height. I used LiDAR height to estimate dbh values in the corresponding biomass equations. I multiplied these biomass values by the number of stems of each species in the plot, scaled the value to hectare, and summed the results. I compared these results with the ground biomass data. For the ground validation of biomass, within the twenty plots I created ten 900-m² subplots, where I identified species, measured dbh for all live stems >12.4 cm, and recorded place in the canopy. I calculated biomass using the species-specific allometric biomass equations from Jenkins et al. (2004), summed the results, and scaled to hectare. I also calculated biomass using only dominant and co-dominant trees. The linear regression indicated that the remote method was a significant predictor of dominant tree ground biomass ($p=0.012$, $R^2=0.568$). These results suggest that this technique can adequately predict stand-level biomass in a southern New England forest. The next step will be to expand the locations to determine the feasibility of using this method for other forest types.

References:

- Malhi, Y., P. Meir, S. Brown. 2002. Forests, carbon and global climate. *The Royal Society* 360(1797):1567-1591.
- Brown, S.L. and P.E. Schroeder. 1999. Spatial patterns of aboveground production and mortality of woody biomass for Eastern U.S. forests. *Ecological Applications* 9(3):968-980.
- Jenkins, J.C., D.C. Chojnacky, L.S. Heath, and R.A. Birdsey. 2004. Comprehensive database of diameter-based biomass regressions for North American tree species. USDA Forest Service Northeastern Research Station General Technical Report NE-319.
- Olson, J.S., J.A. Watts, L.J. Allison. 1985. Major world ecosystem complexes ranked by

Note: this workshop will be repeated in Session 3.

↔ 11:00

Automating ArcGIS with Python

Kristina Grace

Massachusetts Technology Collaborative / Massachusetts Broadband Institute

The Massachusetts Broadband Institute (MBI) is using GIS to support a large fiber optic network build in western Mass, known as MassBroadband 123. ArcGIS tools were created using ModelBuilder and Python scripts to automate repetitive tasks and make them accessible to casual GIS users, allowing the GIS team to focus on other projects.

This presentation will demonstrate how Python is used to run queries and export the results for periodic fiber-optic network cost analyses. Examples will include how to name an object, use a date parameter to query data, add join, add field and convert table to table. A single Python script is used to process a number of GIS tasks in several minutes vs. a manual process that could take 30 minutes or longer. A well-documented ArcGIS tool is created from the script.

Location-Based Crowd-Sourcing for Preference and Place Perception Analysis at UMass Amherst

Alexander Schreyer

University of Massachusetts Amherst, BCT Program

Alexander Stepanov,
GIS Architect

University of Massachusetts Amherst, A&F Administrative Systems

The University of Massachusetts is currently in the process of creating a strategic long-term plan for its physical campus development. This plan/strategy is the result of a recent master planning process and is intended to be transparent and inclusive. To achieve this goal, UMass explored innovative applications of web spatial technology to facilitate the planning process and to learn about the campus public's perception of our campus and its places.

Campus Planning (CP) and the Building and Construction Technology program (BCT) built two separate tools with similar intentions to crowd-source the public's feedback: a) "My Favorite Places", a website built with Google Maps JavaScript APIs, PHP and MySQL and b) "Likes and Dislikes", a web app implemented using ESRI's Flex Web API and Drupal as a backend. Both have been very popular and continue to yield feedback on the campus. With the current trend towards location-based socializing (e.g. using Foursquare), these tools also provide a usable concept for a university to adopt the social component of a favorite places site into providing a venue for students to express their interest in a particular place (and share it with others).

In this presentation, we will discuss the issues related to using spatial web technology to support a public decision process as exemplified in the UMass planning process. We will also discuss technical details of both project implementations and will share what we have learned from our experiences.

Using iTree VUE with GIS to Quantify the Carbon Storage by Urban Trees

Peggy Minnis

Pace University

Many communities have calculated their carbon footprints, but most wonder what role the town's vegetation plays in reducing that number. The iTree suite of tools has a program that works with GIS to quantify those mitigating effects. VUE is a program that works with USGS National land cover data and GIS to provide this information.

↔ 11:30

Spring Cleaning: Geodatabase Style

Mike Doyle

Fuss & O'Neill

I would like to discuss the value of a central database schema, what it takes to properly clean and organize your directory structure. I would then like to discuss the Esri Local Government philosophy and why it is ground breaking and extremely intriguing to a guy like me, who has never voluntarily cleaned anything in his life...

Uses for Your iPad Beyond Angry Birds

Darren Mackiewicz

CDM Smith

Recent rapid advancements in mobile technology have opened up a whole new realm of information management and GIS mobile application capabilities that can benefit all levels of an organization and be made available to users at virtually any location. Whether you are in field operations, planning/engineering, or at the management level, new GIS and mobile technologies can provide customized access to the critical information you and your staff

Determining Flood Return Periods using ArcGIS-based Hydraulic Modeling and Observation

Zhihao Wang and

Chris S. Renschler

University at Buffalo - State University of New York, Landscape-based Environmental System Analysis and Modeling Laboratory

In August 2011, Hurricane Irene swept through a large area in New York State, leaving millions of people homeless and cities in pieces. The damage there was widespread and astonishing, whereas the precise scale of the floods is still unclear. The crucial

require on a daily basis. During this presentation, new trends in GIS and mobile technology will be highlighted. Several topics including data collection, asset inspection and real-time data feeds via Telemetry will be covered. Discover the ways to use the iPad to help you get your job done faster...so you have more time to play Angry Birds.

part of modeling a flood is to decide its return period, especially for the un-gauged areas. This research aims to model the flood inundation and decide the return period using HEC-RAS model, assisted by ArcGIS, incorporating multiple sources of data.

This research focuses on an area located in the Schoharie Watershed between North Blenheim and Breakabeen, which was attacked by

Irene-invited floods and has U. S. Geological Survey (USGS) gauging stations on both ends. HEC-RAS utilizes 10m USGS DEM, LiDAR data, NLCD land-use data, and flow rate data from two nearby gauging stations as input parameters. In addition, aerial imagery taken two days after the peak flooding using an RIT/IPLER airborne multi-sensor platform was inspected visually to establish the flood extent. Model results were validated against field observations, and previous FEMA flood model results. The modeling process, once validated, can be applied as important reference instruction to guide the best management plans for the decision makers and stakeholders.

12:00 – 1:15

Lunch

Campus Center Atrium (Second Floor)

◆ 12:15

Lightning Talks

Campus Center Carroll Room 208

Moderator: Mike Olkin

Perspectives on Public Sector Data Sharing

Michael Olkin
Town of Amherst

A brief look at how the Town of Amherst's approach to sharing GIS data has evolved over the past few years.

National Hydrologic Dataset Stewardship in Massachusetts

Brian Brodeur
Massachusetts Department of Environmental Protection

The Massachusetts Department of Environmental Protection has a memorandum of understanding with the United States Geological

Survey to be the stewards of the National Hydrologic Dataset (NHD) in Massachusetts. This talk is to announce the opportunity for interested parties to help guide NHD in Massachusetts.

Social Media and GIS

Sam Berg
Esri

Maps have long supported collaboration and the sharing of information. Social media networks, on the other hand, have evolved into an ideal environment for broadcasting to target audiences the availability of geographic information. Indeed, social media messages and posts can even act as a primary source for the data. This lightning talk will highlight ideas about sharing maps and capabilities to these dynamic environments, as well as utilizing social media within GIS maps.

Lightning Karaoke

Michael Olkin, The Composer
Town of Amherst

An intrepid member of the audience agrees to tell a story about a stack of seemingly unrelated slides, with hilarious results!

I'm Building a GIS Boat. Will It Float?

Adam Kurowski
Town of Arlington, MA

A summary of year-one of GIS in Arlington. Can centralized data, new technology, workflow changes, and government employees all row in the same boat?

Enabling Geospatial Data Access via Education: A MAGIC Approach

Michael Howser
University of Connecticut Libraries Map and Geographic Information Center (MAGIC)

At the University of Connecticut Libraries Map and Geographic Information Center (MAGIC) and the Connecticut State Data Center our focus is on developing educational opportunities for students related to geospatial data and analysis. Over the past two years, an internship program along with a series of independent study projects has enabled students to work directly with geospatial data while also developing publicly accessible data resources and reports. Join us as we explore this model and how focusing on education has enabled MAGIC and the Connecticut State Data Center to provide increased access and

GIS at Any Scale

Jane Garb, MS
Baystate Health

This talk is based on the work I have done in mapping the human body and the gene. Few, if any, examples of similar GIS applications exist. I will discuss the rationale and relevance for mapping at each of these scales, the technical problems that arise, and GIS and spatial analytic solutions to these problems. A few illustrative examples from my clinical research will be presented.

Using the "Early, Often, and Just the Right Amount" Approach to

Integrating GIS into the Liberal Arts Curriculum

Janine Glathar
Bucknell University

Bucknell created the GIS Specialist position in 2009 with the broad goal of integrating GIS across the curriculum and infusing spatial thinking throughout students' classroom and research experiences. Instead of just offering two GIS classes (GEOL230, "Environmental GIS" and GEOG204, "Applied GIS"), leaders within Bucknell's academic, library, and technology divisions wanted to go deeper and were willing to provide the support flexibility and

to provide increased access and support to the public.

provide the support, training, and incentives needed to help pave the way.

With that support behind us, Bucknell GIS has adopted the strategy of “early, often, and just the right amount,” to guide our decisions on teaching/research priorities and software/data infrastructure.

1:15 – 2:45

Session 3

Map Services

Campus Center Carroll Room 208
Moderator: Niels la Cour

Scientific Applications

Campus Center Room 103/104
Moderator: Andy Anderson

Safety

Campus Center Room 205
Moderator: Alexander Stepanov

Census Workshop Option 2

Sabin Reed Hall Room 104
Coordinator: Jon Caris

◆ 1:15

GIS Smartphone Apps

John Waterman
GCS Research

In 2012, over one billion smartphone users exist worldwide with over 91 million in the US alone. It is predicted in the near future, fundamental human needs will consist of only bread, water, and a smartphone. This presentation will discuss how you can extend your GIS reach into the field, down the hall, and to your customers. Examples and live demonstrations will be provided. In the very near future, all your customers will have smartphones and your GIS can be there with them.

Extending GIS with Statistical Models to Predict Marine Species Distributions

Zach Hecht-Leavitt
New York Department of State Division of Coastal Resources

Coastal and marine spatial planning (CMSP) is a framework for addressing competing uses in crowded offshore environments, such as siting renewable energy and protecting critical habitats. While detailed spatial information on the abundance and distribution of marine species can help identify critical habitat areas and inform the planning process, such information is often unavailable. However, limited point counts of species abundance can be combined with maps of environmental variables and/or measures of spatial autocorrelation to produce high-resolution, continuous species distribution maps along with prediction error estimates. This presentation describes two such approaches with case studies in waters offshore of Long Island.

We first modeled the seasonal abundance of six species of groundfish from the NOAA Northeast Fisheries Science Center’s bottom trawl survey program as a function of environmental variables such as depth, sea surface temperature, chlorophyll a, and zooplankton biomass. We used statistical models in R to quantify the relationship between these environmental variables and abundance, and ArcGIS Geostatistical Analyst to account for the spatial autocorrelation structure of the data.

We also obtained point counts of cetacean abundance from the North Atlantic Right Whale Consortium database. Although the sample size was too small to permit development of species-environment relationships, we were still able to interpolate the point counts using a combination of kriging methods in ArcGIS Geostatistical Analyst and statistical methods in R. We used a two-stage approach which allowed us to model probability of presence separately from abundance. We then combined the two stages

GIS Disaster Recovery and Business Continuity

James Hall
Bowne Management Systems

Being able to resume operations again quickly after a disaster hits is important to GIS organizations that support public safety, public health, and other critical functions of government. This presentation will review case studies of both proactive planning efforts and post-event responses by GIS professionals. The speaker will discuss the activities performed by different organizations that he has worked with and the lessons learned.

Census Data and Spatial Applications: Transforming Census Data into Maps

Michael Howser
University of Connecticut Libraries Map and Geographic Information Center (MAGIC)

Steven Batt
University of Connecticut Libraries

Jie Lin and Jonathan Pollak
University of Connecticut Department of Geography

Do you need to use Census data for mapping projects and have limited time? This workshop will highlight how to locate census data using the New American FactFinder and transforming this data into geospatial friendly formats. Join us as we remove the frustration from mapping census data during this hands-on workshop as we locate, download, and transform census data into geospatial friendly formats.

Note: this workshop is a repeat of the one in Session 2.

then combined into the output, resulting in conservative estimates of abundance-when-present.

For both these studies, we estimated and mapped prediction error and calculated a number of other model performance metrics. This helps the end user judge the appropriateness and validity of the final maps for themselves.

◆ 1:45

Government Map Services for Business and Industry

Sam Wear
Westchester County GIS

Initially used as a means to publish large catalogs of geospatial data for viewing in public web mapping programs, government map services are now being consumed by industry and business applications. This expanded “e-community of users” creates a new dimension in the use of government funded and created map services.

A long time supporter of using map services in commercial and open source viewers (i.e., ArcGIS Explorer, Google Earth, Gaia, others) Westchester County GIS is now also focusing on the strategic publication of map services which cost-effectively enhance third-party business applications being used in local governments throughout the County.

This presentation will provide an overview of this new public/private paradigm, including a discussion of pros/cons, lessons learned, and how the model might be applied in other areas of the ESRI user group community.

Chemboxes: Labeling Maps with Sampling Results

Christopher Coutu
Town of Westford, MA

Labeling maps with environmental sampling data “chemboxes” using vbscript. Basic concepts of flattening data tables, using escape codes to avoid “open tags” when labeling, and using scripting to choose data that is displayed. Scripting is made simple and easy to follow.

Locating Individuals Requiring Additional Assistance (IRAA) — Another Tool For Safety Personnel

Lynne W. Fielding, GISP
Town of Westwood

The Town of Westwood has been working on a registry for Individuals Requiring Additional Assistance (IRAA). This originated as a way for Police and Fire to have advance notice if they were going to a home with an autistic or disabled child and has been expanded to include anyone requiring special assistance, child or adult, with the permission of their parent or guardian as necessary. A census question has been included to ask for people to self-identify, and, in addition, outreach from the schools to parents has been made.

The information is linked to pdf atlases, which are maintained in dispatch and all emergency vehicles. Police and Fire have different atlases but the links work the same for both. A picture is obtained of each person and becomes the first page of the pdf so that Safety personnel see the picture before their personal information. The underlying maps may be updated as needed, links updated as needed and redeployed as soon as a change is made. No special software is needed in the emergency vehicles, just the ability to read a pdf and know how to use the clickable atlas.

◆ 2:15

Community Maps Program Update

Donald Cooke and
Alfredo Frauenfelder
Esri

Esri’s Community Maps program is in its third year and a lot will change in 2012. The Community Maps are a suite of global maps in image-cache form hosted in the cloud by Esri. The Maps work at scales from global down to 1:1000 neighborhood detail. They can be used in desktop, web, and mobile environments. They’re called “Community” maps because they contain an increasing amount of authoritative data contributed by participating agencies, frequently the GIS arm of cities, states, or national mapping agencies.

The Community Maps Program is evolving rapidly in 2012. This presentation will describe a streamlined and simplified methodology for participation, a new design for the World

Mapping the Genome: A Spatial Analysis of Gene Expression on the Mouse Chromosome

Jane Garb, MS
Baystate Health

Joseph Jerry, PhD
Pioneer Valley Life Sciences Institute

Mary Hagen, PhD
University of Massachusetts

Jennifer Friderici, MS
Baystate Health

We present a novel application of spatial statistics at the scale of the genome. We used locational information for 21,000 genes on 21 mouse chromosomes to map them in the GIS. We then conducted cluster analysis to investigate spatial patterns of genetic expression. This approach provides an alternative to traditional statistical analysis which avoids the assumption of independence of observations and accounts for spatial proximity. Our study was

Topographic map, and ways to incorporate participants' content in more maps and at more scales. If you are a current or prospective CM participant, this is a good way to get a sneak-peek at program enhancements that will be highlighted at the July User Conference.

conducted to identify mechanisms responsible for the reduced risk of breast cancer after a full-term pregnancy. We examined patterns of genes differentially expressed in the mammary glands of nulliparous and parous mice. Our finding of statistically significant clusters of genes that are differentially expressed demonstrates that control of gene expression is coordinated and based on their spatial organization. We shall discuss the relevance of these findings in identifying a mechanism for stable differences in gene expression and implications for risk of carcinogenesis. Applications using this methodology present rich opportunities for collaboration between cell biologists, epidemiologists, spatial statisticians, and GIS professionals in order to advance knowledge of genetic mechanisms.



2:45 – 3:00 Refreshment Break and Poster Session

Campus Center Atrium and Lounge (Second Floor)

3:00 – 4:00 Session 4

Water Resources

Campus Center Carroll Room 208

Moderator: Mike Olkin

Census Applications

Campus Center Room 103/104

Moderator: Andrea Newman

Economics

Campus Center Room 205

Moderator: Jane Garb

ArcObjects Workshop

Sabin Reed Hall Room 104

Coordinator: Jon Caris

↔ 3:00

Oil Spill Response Planning: Coastal and Marine Environmental Sensitivity Mapping

Simon Ross

ERM

In the wake of the 2010 Gulf Spill many oil and gas companies are revisiting their spill response plans for both new and existing developments. Key to successful planning is understanding where the potentially sensitive environmental resources are, both on the coast and in the marine environment.

Based on the most recent international IPIECA guidelines ERM has developed an initial desk-based mapping and sensitivity classification approach, using existing data sources and remote sensing interpretation as a precursor to more detailed field surveys. This approach enables rapid assessment of potentially sensitive locations.

In addition to providing the analytic tools and central data repository, a GIS web application and supporting map services provide access to all project data and metadata. Web editing tools enable client and contractor personnel to plot and share proposed locations for response resources (e.g. staging areas) during the response planning stage. This approach dramatically reduces reliance on traditional paper mapping

How to Put GIS to Work for Voting Redistricting

Michele Giorgianni

Applied Geographics

The 2010 census data update is driving the review and revision of voting districts across the country at the state and municipal levels. GIS is an obvious choice for getting the job done, but how? This presentation will review different approaches that municipalities are using to adjust or even completely reconfigure voting districts taking into account state redistricting, new census data, registered voter statistics, historic voting patterns, and polling station locations, among other things. A selection of towns from southern New England will be discussed to illustrate methods and results.

Comparative Foodshed Analysis of Potential Local-Regional Food Production Across the U.S.

Graham Jeffries

Tufts University, Friedman School of Nutrition

Eating "locally" has adsorbed to popular understanding of sustainable living, but the notion that "local is best" goes largely untested in much dialog at the intersection of food, environment, and social justice. In this presentation I show how spatial analysis tools are used to tease out the geographic intricacy of connecting balanced diets and biophysical resources in re-scaled "foodsheds" across the United States. The central inquiries of this presentation are, "what foodshed size could produce enough food for all of its residents?" and "how does the 'optimum' size vary across the US?". I demonstrate how Python scripting and parallel processing are used to complete highly iterative network-based foodshed analyses. The novel "comparative foodshed analysis" approach demonstrates that there may be many more than 100 food miles between you and a resilient, just food system.

Clipping Multiple Datasets Made Easy

Brian Hebert

ScribeKey

Creating clipped out, smaller subset areas of very large datasets is useful for exploring and evaluating data faster and more efficiently. In this presentation, a custom developed ArcObjects/GeoProcessing (ArcGIS 10) batch console utility for clipping multiple datasets using an arbitrary set of polygons as clipping features will be discussed, demonstrated, and provided to attendees as freeware. US Census data will be used in the examples.

↔ 3:30

Bathymetry Changes Caused by a Tropical Storm

Chris Scheiner and Gary Pelton
US Army Corps of Engineers

Following the occurrence of Tropical Storm Irene in August 2011, we endeavored to determine a) whether the storm had any significant impact on local lake bathymetry and b) whether a survey using inexpensive equipment would be sufficient to provide enough information to evaluate the impacts.

We measured water depth across Dewey's Mills Pond, a shallow 50-acre pond in Hartford, VT, shortly after the tropical storm. We used a recreational grade Garmin GPS unit and surveyed from a canoe. Measurements were taken with a sounding pole and recorded to the nearest quarter foot. We compared our results to those of a survey conducted several years prior to the storm in order to evaluate change.

By contrasting a subset of discrete measurements from each survey we determined that water depth decreased by 1-2 feet over the intervening time period at specific locations within the pond. Further comparison of interpolated surfaces generated from each dataset corroborated this change for the entirety of the pond.

Normal flow rates into the pond are generally quite low, suggesting that sedimentation exclusive of the storm event is unlikely to have caused the changes observed even over several years. In contrast, rainfall rates recorded during the storm and flow rate records from nearby streams combined with turbidity observations made immediately after the storm all suggest that water and sediment transport rates during the storm were sufficient to account for the sedimentation we observed. Local evidence of flood damage further corroborates this hypothesis, so we conclude that Tropical Storm Irene is responsible for the observed bathymetry changes.

Furthermore, we found that the survey equipment we used was acceptable for our purposes. The lake bottom is relatively homogeneous and changes in depth are gradual, so given the precision of our measurements the GPS reported our position with sufficient accuracy.

Making Census of Cambridge, Massachusetts: Schools, Highways, and Historical GIS

Andy Anderson, Josie Fisher, Yinan Zhang, and Hilary Moss
Amherst College

Cambridge, Massachusetts, home of Harvard University and the Massachusetts Institute of Technology, has a history almost as long as that of Boston. Just across the Charles River, it has shared in the twentieth century travails of most urban centers, experiencing decaying infrastructure, declining tax bases, and increasing poor, immigrant, and minority populations. Despite its reputation as a liberal bastion, in the 1960s and 1970s Cambridge found itself on the wrong side of racial imbalance in schools and embroiled in an intramural battle over a bisecting highway.

These issues were studied in an Amherst College research seminar last spring. Since then, we have developed an in-depth analysis that relies extensively on GIS to understand the impact of school redistricting and proposed highway routes. Key to these efforts were the digitizing of historical block-level data from printed census tables, which could then be dissolved into the areas of interest, allowing a much more precise characterization of the affected communities.

Mapping the Recession by Economic Region

Bob Jones
Skidmore College

GIS will be used to map the recent recession illustrating the state-by-state nature of the recession. A methodology will be shown for grouping the states into economic regions based on their economic behavior. The states will then be dissolved into these economic regions to show the regional economies of the contiguous states and their behavior during the recession.

4:00 – 5:00 NEARC User Group Forum / Open Discussion / Poster Contest Winner Announcement

Campus Center Pub (Ground Floor)

4:15 – 5:00 Botanic Garden Tour

[Smith College Botanic Garden](#)

Campus Center Lounge (Second Floor)

Coordinator: Tom May

Environmental Studies

Areas of Potential Susceptibility of Emerald Ash Borer Infestation in the Capital and Northern Catskill Region

Emily Merritt, Melyssa Smith, and Katherine Meierdiercks

Siena College

The emerald ash borer (*Agrilus planipennis*; EAB) is a non-native invasive species that has been found in ash trees from the central United States to the East Coast. Concern about EAB infestation in New York is focused on green, black, and white ash trees, and its spread facilitated by the transport of infested ash logs, trees, or firewood to non-infested, vulnerable areas. This project examines the current and future potential of EAB infestation within the New York State Department of Environmental Conservation's Region 4 (Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady, and Schoharie counties). The main objectives of this project are to evaluate the potential EAB infestation areas within Region 4 based on white, black, and green ash tree distribution and the connectivity between currently infested areas and the presence of DEC campgrounds within Region 4. GIS analysis is used to explore the connections between ash tree distribution, location of DEC environmental recreation facilities (campgrounds), and current EAB infested areas. Current infestation extents related to vegetation distribution are examined and areas predicted to be most susceptible to EAB infestation are assessed in order to determine the levels of risk (high, moderate, and low) associated with this invasive species. These assessments show which areas have not been infested already but could be in the future, and also suggest that human influence is a contributor to the spread of EAB in Region 4 of NYS.

Potential Bog Turtle (*Clemmys mühlenbergi*) Habitat in Albany County

Jeni Casinelli and

Katherine Meierdiercks
Siena College

Currently the bog turtle has been listed as a threatened species in the United States and has been listed as an endangered species in New York State. As we speak, the NY Department of Environmental Conservation is working with owners of private land to help restore bog turtle habitat in New York counties including Columbia, Dutchess, Ulster, Orange, and Putnam. It may also be possible to

Using Echolocation Call Recording Techniques and GPS to Monitor Bat Populations in Connecticut in the Wake of White-Nose Syndrome

Katherine Moran

Connecticut Department of Energy and

Environmental Protection

Since its discovery in 2006 in eastern New York, white-nose syndrome (WNS) has caused significant bat mortality in eastern North America. In January 2012 the US Fish and Wildlife Service (USFWS) announced that between 5.7 and 6.7 million bats have died as a result of WNS. To limit the potential spread of WNS, the USFWS advises researchers to minimize activities (such as mist-netting or entering hibernacula) that might facilitate disease transmission or cause unnecessary disturbance to bats that may already be infected. Advances in echolocation call recording techniques, however, have made it possible to collect large amounts of data on bats without posing such threats. In 2011 the Connecticut DEEP Wildlife Diversity Program (WDP) initiated an acoustic monitoring study that seeks to document bat activity across the state and throughout the active season. Nine 20-mile driving transects were monitored twice per month from May to October 2011. Vehicles equipped with GPS and ultrasonic recording devices were slowly driven along the transects while WDP staff and volunteers recorded bat vocalizations and GPS coordinates. Analysis of this data will provide important baseline information on species presence, distribution, and seasonal activity levels, while contributing to the broader regional understanding of bat populations in the wake of WNS.

Two-Dimensional Evaluation: The Environmental and Socioeconomic Impacts of Mexico's Payments for Ecosystem Services Program

Katharine Sims and Leah Fine

Amherst College

Jennifer Alix-Garcia, Patricia Yanez-Pagans, and Volker Radeloff
University of Wisconsin-Madison

Elizabeth Shapiro

Duke University

Payments for ecosystem services (PES) programs are likely to expand under international agreements to reduce carbon emissions from deforestation and forest degradation but empirical evidence on their effectiveness is limited. We investigate impacts of a federal program in Mexico that

Landscapes / Geology

Historical and GIS Analysis of the Kromma Kill Watershed and Its Effects on Flooding

Adam Davis, Kelly Byrnes, Yu Shen, and Katherine Meierdiercks

Siena College

The Kromma Kill Watershed, located in Albany County, New York, is prone to flooding and other water quality issues. Previous research suggests that alterations to the stream channel network and conversion of open space to suburban land uses is the likely cause of this flooding. Our study addresses these problems through GIS analyses of stream channels, storm water pipe networks, retention ponds, terrain profile, and detention basins. ArcGIS software is used to analyze development in the watershed over the last hundred years and to analyze drainage network structures. Historical maps were georeferenced on data layers that we obtained to show changes that the area experienced over time. Efficiency of the drainage network was determined using width functions, drainage densities, and impervious area curves. Results provide insight into the urban and geological features that influence flooding in the Kromma Kill Watershed.

The Geochemical Impact of Wildfire and Mining on the Fourmile Creek Watershed, Colorado

Sarah Beganskas

Amherst College

Wildfire and abandoned mines both have profound geochemical effects on a watershed. However, the combined impact of the two disturbances is not well-studied. In September 2010, a severe wildfire burned 26 km² of the Fourmile Creek catchment in the Colorado Front Range. Located in the Colorado Mineral Belt, the area was historically mined for gold and is still affected by mine drainage and the erosion of tailings. This study, which takes place soon after the

first storm event following the fire, examines how the combined disturbances of wildfire and mining affect water and sediment chemistry in this catchment.

Water and sediment samples were collected from 22 tributaries of Fourmile Creek, as well as ten locations along Fourmile Creek. ArcGIS was used to quantify the fire intensity, degree of mining disturbance, underlying bedrock, and slope of each tributary watershed, and these results were

Municipal / Planning

South Windsor Citizen Service Request Dashboard

Scott Roberts, Dawn Mulholland, and Drew Guild

Town of South Windsor, CT

The Town of South Windsor prides itself in citizen collaboration efforts and town accountability! We have designed an application with the efforts of ESRI to combine both of these functions into a real-time request for services in an online dashboard system. Town residents can stay informed of happenings in their town from street closures to drainage issues as well as town events such as parades! Town staff can better manage these requests and events using this application on a daily basis and fun reports to better inform town management and council members. This video will give an overview of what our dashboard application uses are and how it is used everyday in South Windsor.

A First Look at GeoDesign and Parametric Modeling Technologies

Walt Jaslanek

University of Massachusetts

This poster-type presentation identifies the trending interactive visualization techniques in the GIS field including ArcGIS CityEngine and Google SketchUp technologies as part of a visual impact study.

restore the bog turtle population in Albany County. Research has shown that the bog turtle needs an environment categorized as early succession habitat surrounded by slowly moving water and deep soft muck soil, all of which are present in Albany County. This project aims to identify the potential for bog habitat restoration within Albany County by (1) determining specific habitat needs for the bog turtle to thrive, and (2) using GIS to determine the land areas that meet these habitat needs. Criteria were developed that rates how hospitable an area would be to a bog turtle and the criteria were applied to parcels in Albany County using ArcGIS ModelBuilder. Results of the project provide insight into where potential bog turtle habitats exist within the County.

An Analysis of Potential Limitations to the Northward Expansion of *Jeffersonia diphylla*

Karyn R. Nelson
Smith College

Most plant species distributions are in equilibrium with the environment, where range edges are found at the margins of the gradient and the center of the range is found near the center of the gradient. However, some species do not show evidence of equilibrium with the environment; instead, these species may either be tracking environmental changes at a slower rate than the environment changes (e.g. climate) or may have reached a point where dispersal is somehow limited (e.g. a barrier). *Jeffersonia diphylla*, an ant-dispersed woodland herb found in eastern North America, is native to parts of the Southeast and Midwest, but absent from the Northeast. Throughout its range, *Jeffersonia* is closely associated with calcareous soils and bedrock. Population surveys have shown that populations are larger and individual fitness and reproduction are higher along the northern range edge (western New York) compared to the center of the range (Ohio and Indiana). This pattern suggests that *Jeffersonia* may be dispersal-limited in its distribution and that there is highly suitable habitat beyond its current range edge in the north that has yet to be colonized. This study will make use of data layers including bedrock geology and stream geochemistry, as well as the species' current range, in order to find barriers to northward expansion, which is expected with current climate change. Forty-nine percent of *Jeffersonia's* range is found over calcareous bedrock and thirty-four percent is found over shale bedrock. Seventy-one percent of *Jeffersonia's* range is found over low or moderate levels of calcium. There is a strong positive relationship between calcareous bedrock and calcium levels, which implies that bedrock type, and not calcium level, is more important to

compensates landowners for forest protection on two dimensions: deforestation and household wealth. To establish counterfactual deforestation rates and growth in household assets across time, we use matched controls from the program applicant pool. We find significant evidence that deforestation was reduced by the program and suggestive evidence of positive socioeconomic benefits. Our analysis of heterogeneity in program effects indicates that most efforts to further increase avoided deforestation would have regressive wealth impacts. A possible exception is additional targeting of funds to common property recipients.

used in conjunction with chemical analyses of samples.

Streamwater concentrations of most major solutes and trace elements increase in burned and mined watersheds relative to unburned and unmined watersheds. Mining intensity correlates positively with SO_4^{2-} and negatively with HCO_3^- in tributaries, while fire intensity correlates positively with SO_4^{2-} , NO_3^- , and major cations, but notably not with HCO_3^- . Acidity from mine drainage and local carbonate deposits reduce the effect of wildfire on streamwater alkalinity. Sulfate concentrations are 6.2 times higher in burned than in unburned tributaries, and this exceptional increase is likely due to additional SO_4^{2-} input from mining. Downstream changes in water chemistry along Fourmile Creek reflect substantial influence from burned and mined tributary input, with especially large increases in conductivity, SO_4^{2-} , and Ca^{2+} through the disturbed area. Stream sediment from burned watersheds has increased percentages of most major oxides, and less SiO_2 and nutrients. Mining is not associated with substantial changes in major oxides or

nutrients in stream sediment but supplies increased mercury. In the short-term, the Fourmile Fire, exacerbated by historical mining, dominates the chemistry of Fourmile Creek and its tributaries.

the distribution of *Jeffersonia*. With a lack of widespread calcareous or shale bedrock in the Northeast, northward expansion of *Jeffersonia* seems limited, which in the face of current climate change will be

detrimental to the species.