Learning Science Through the Innovative Use of Geospatial Technologies: Designing Effective Learning Tools and Programs for K-16 settings

- Michael Barnett, Boston College
- Jim MaKinster, Hobart and William Smith Colleges
- Nancy Trautmann, Cornell University

Geospatial Technology

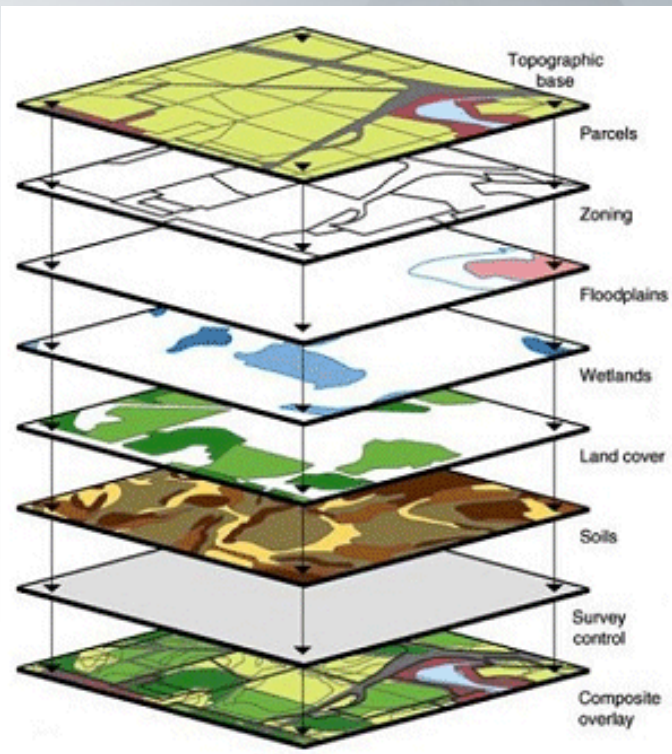
- Geographic Information Systems
- Global Positioning Systems
- Virtual Globes
  - Google Earth
  - WorldWind
  - AcrGIS Explorer
- Web-based 2D and 3D visualizations

Why this session?

- "*Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum*" (National Research Council, 2006)
  - Geographic information science **has significant but as yet unrealized potential** in the K-12 curriculum. In principle, GIS reflects many of the ideals of exploration-driven, discovery-based, student-centered inquiry…. Current GIS is too cumbersome and **inaccessible for effective use in K–12 education** (p. 8).

Goals for the book

- This book will:
  - synthesize efforts to date that have examined the learning outcomes attributable to use of geospatial technology
  - develop a framework for thinking about teaching with geospatial technology, and
  - explore various design principles within specific contexts.



Goal for the Book/Session

- What are the issues facing educators using geospatial technology in terms of:
  - design?
  - development?
  - research?
- First book (Teacher PD) was organized by:
  - Research section
  - Design section
    - Shift to themes

An Opportunity

- Document current efforts and projects
  - 21 chapter proposals received
- Explore the iterative design of projects over time
- Forward a framework for thinking about design of geospatial learning environments
- Ask and explore a variety of specific questions?
  - Role of geospatial technology in environmental education, geo edu., other fields, etc…

Audience

Who?

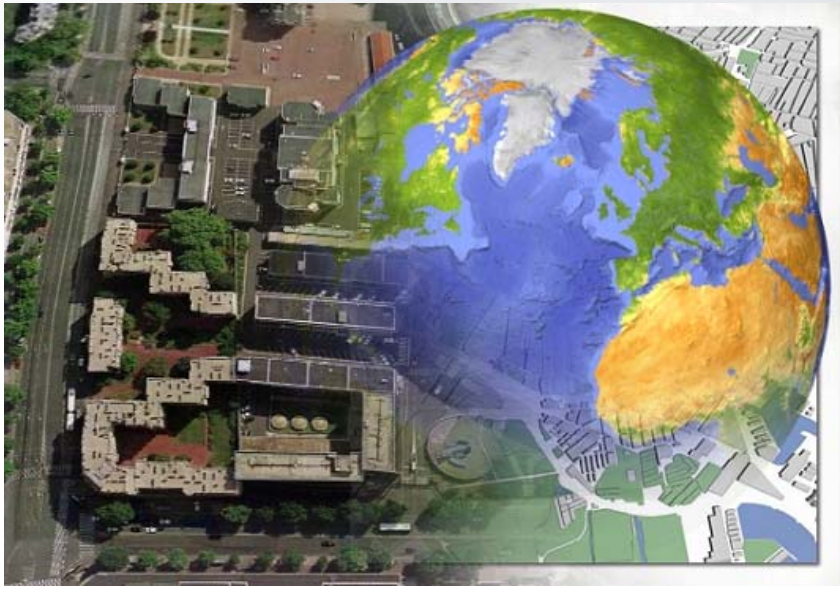
- Science education faculty, developers and researchers
- Science faculty
- Geography faculty
- Museum or center staff
- Academic researchers
- Teacher educators

Doing what?

- Designing geospatial software
- Conducting educational research
- Conducting science outreach
- Designing learning environments for K-16 students

Book Structure

- Introduction
  - Role of Geospatial technologies in support learning in the geosciences
  - Role of geospatial technologies in support of learning in geography
- Themed based book to decided by the communities' feedback, insights, and ideas
- Closing chapter
  - Hopefully collaborative
    - 21 proposals received



Title Word Splash

Contributing Authors

- Walt Allen – Foundation for Blood Research
- Alec M. Bodzin – Lehigh University
- Sarah Bednarz – Texas A&M University
- Bob Coulter – Litzsinger Road Ecology Center
- Jacqueline Ebenezer, Wayne State University
- Daniel Edelson – National Geographic
- Janice Gobert – Worcester Polytechnic Institute
- Rita Hagevik – University of Tennessee at Knoxville
- Bob Kolvoord – James Madison University
- Fred Martin – University Massachusetts Lowell
- James Matthews – University of Wisconsin
- Catherine Stylinski – University of Maryland Center for Environmental Science
- Kenneth Yanow – Southwestern College
- Daniel Zalles – SRI

Important Dates: Tentative

- December 1, 2009: Chapter Proposal Submission Deadline
- March 15, 2010: Notification of Acceptance
  - Still working on structure of the book and accepting proposals!!
- May 1, 2010: Full Chapter Submission
- June 15, 2010: Chapter Review Returned
- September 1, 2010: Revised Chapter Submission Deadline
- January 1, 2011: Book Draft Submitted to Springer
- To Be Determined: Final Revisions Based on Feedback From Springer

Questions?

Michael Barnett
Boston College
barnetge@bc.edu

James G. MaKinster
Hobart and William Smith Colleges
makinster@hws.edu

Nancy M. Trautmann
Cornell Lab of Ornithology
nmt2@cornell.edu

Ideas… to answer

- What are the outstanding issues in terms of geospatial technologies in K-12 education?
- Others (yours) projects for inclusion in the book?
- Other general chapters?