EMBEDDING GIS IN THE LIBERAL ARTS CURRICULUM – WHERE WE’RE AT IN YEAR 3 & WHERE WE’RE HOPING TO GO WITH THIS AT BUCKNELL
Overview

- Who am I? What do I do?
- Evolving strategy
- Greasing the wheels
- Where we’re at now
- What’s next
Who am I? What do I do?

- GIS Specialist
  - New position at Bucknell
  - Work out of Library & IT Division
  - Integrate GIS & spatial thinking across the curriculum in teaching and research
  - Serve as a resource for faculty and students
Getting GIS in early…

- Into courses required in 1st/2nd year:
  - Foundation seminars
  - Residential colleges
  - Transition to college workshops
  - Methods classes
  - Integrated perspectives (IP) courses
    - New requirement
    - Brand new courses
    - Interdisciplinary/holistic approach = perfect fit for GIS
Getting GIS in often...

- Into seminal learning experiences
- Faculty-led student research
- Independent student research
- Independent study
- Senior design courses
- Honors theses
- Service learning & community engagement
Getting GIS in ‘just the right amount’…

- **ArcGIS**
  - GEOG204, ENGR101, ENST302

- **GoogleEarth/Maps**
  - HUMN272, ENGL224, Environmental Residential College

- **Data/Map Tools**
  - RELI233, ECON312

- **Custom web map apps**
  - Still in the works
    - ‘New Orleans in 12 Movements’ IP course
    - HUMN 290, ‘Susquehanna Stories’
    - HIST275, ‘Mills, Milling & Local History’
Greasing the wheels

- **Resources & incentives**
  - Library & IT budget
    - ESRI site license
    - Stipends for course revision
    - GIS student assistants
  - 3 year Mellon grant (we’re in year 2)
    - Stipends for faculty attending GIS workshops
    - Stipends for faculty who revise courses to include GIS
    - Stipends for student researchers to develop data for use in courses that integrate GIS
    - Stipends for student researchers to collaborate on faculty research projects
    - Money to buy data and/or pay consultants
Where we’re at now

- Snapshot of GIS in teaching & research
GIS in teaching across Bucknell

- BIOL 353 (Ecosystem Ecology)
- BIOL 415 (Conservation Biology)
- BOTS (Bucknell Semester on the Susquehanna)
- CENG 305 (GIS Applications for Engineering)
- CENG 320 (Water Resources Engineering)
- CENG 330 (Introduction to Transportation Planning)
- CENG 421 (Hydrology)
- CENG 42x (Groundwater Hydrology)
- CENG 422 (River Mechanics)
- CENG 432 (Urban & Regional Planning)
- CENG 490 (Senior Design)
- CSCI 361 (Software Engineering)
- ECON 102 (Methods)
- ECON 312 (Health Economics)
- ENGL 224 (Visions of the Susquehanna)
- ENGR 101 (Engineering Graphics)
- ENST 200 (Acquiring Environmental Knowledge)
- ENST 211 (Environmental Pollution & Control)
- ENST 302 (Environmental Research Methods)
- ENST 255 (Environmental Justice)
- FOUN "Families in History and History in Families"
- FOUN "Blue Highways” foundation seminar
- GEOG 101 (Introduction to Human Geography)
- GEOG 175 (Landforms of the World)
- GEOG 204 (Applied GIS)
- GEOG 257 (Global Environmental Change)
- GEOG 332 (Evolution, Ecology & Human Impact)
- GEOG 345 (Food & the Environment)
- GEOL 103 (Physical Environmental Geology)
- GEOL 230 (Environmental GIS)
- GEOL 310 (Applied Environmental Geomorphology)
- GEOL 320 (Flood Analysis)
- HIST 275 (Mills, Milling and Local History)
- HUMN 128 (Myth, Reason, Faith)
- HUMN 272: (Nature and Enlightenment)
- HUMN 290 (Susquehanna Country)
- HUMN 301 (Brain, Mind, and Culture)
- PHYS 147 (Energy & Sustainability)
- PSCI 140 (American Politics)
- RELI 233 (Global Feminism & Religion)
- UNIV 266 (Sustainable Building Design)
- WMST 233 (Global Feminism & Religion)
- Susquehanna Summer Writer’s Institute
- Environmental Residential College
FOUN 091 – Families in History & History in Families
GIS in research across Bucknell

- Environmental activism in Kyrgyzstan (Amanda Wooden)
- Stories of the Susquehanna (Alf Siewers, Katie Faull, Ben Marsh, Duane Griffin)
- Susquehanna Valley Summer Writer’s Institute (Alf Siewers, Amanda Wooden)
- Susquehanna River Initiative (Ben Hayes, Matt McTammany)
- Beaucarnot Diary (David Del Testa)
- Turtle Species Range Distributions (Tristan Stayton)
- Green Building (Beth Duckles)
- Inside Out (Coralyn Davis)
- China Network Analysis (Song Chen)
- Newt Species Ranges (Mizuki Takahashi)
- New Mexico Plutons (Chris Daniels)
- Campus Greening Initiative (Duane Griffin, Michelle Oswald)
- Sea Level Rise & Transportation Planning (Michelle Oswald)
- Local Mills (Tom Rich, David Del Testa)
- Hill Fort Viewshed Analysis (Kevin Daly)
- Fluvial environments (Matt McTammany)
- Bridge safety (Jessica Newlin)
- Bucknell Arboretum Project (Duane Griffin, Mark Spiro)
- Geisinger Obesity Project (Carl Milofsky)
- Miller Run Restoration Project (Matt McTammany, Craig Kochel, Dina El-Mogazi, Dennis Halley)
- Hidden Discrimination & GIS (Ben Marsh)
- Health Care Atlas (Amy Wolaver)
- John Smith Trail Initiative (Katie Faull, Alf Siewers)
- Lewisburg Genealogy (Marj Kastner)
- Mapping Tolstoy (Slava Yastremski)
- Marcellus Shale Initiative (Carl Kirby)
- Sudan Field Atlas Guide to Mammals (DeeAnn Reeder)
- Susquehanna Sustainability Indicators Project (Peter Wilshusen)
- Bat White-Nose Syndrome Arousal Study (DeeAnn Reeder)
- Frac Water Transport (Kevin Gilmore)
- Four Roads to Vietnamese History (David Del Testa)
Locations of Nghe-Tinh Soviets and Protests (1930-31) shown in relation to NgheAn and HaTinh communes. Communes are clipped to areas where slope is 2% or less and are classified by type of rice cultivation.

Legend:
- ★ Nghe-Tinh Soviets 1930-1931
- ❁ Nghe-Tinh Protests 1930-1931

Rice Cultivation in NgheAn and HaTinh by rice month category, low slope only:
- No rice cultivation
- 5th Month Rice
- 10th Month Rice
- 5th and 10th Month Rice
- 5th and 8th Month Rice
- 8th Month Rice
Environmental Activism in Kyrgyzstan

Environmental Hazards & Resources

Legend:
- Dumps
- Tailing Dumps
- Toxic Waste Tailings
- Radioactive Tailing Dumps
- Radioactive Waste Tailings

Incorporating Modern GIS Data

Layers:
- American Indian sites, Wallace’s Indian Paths, and streams
- Georeferenced German North Branch map
- Oil and Gas Wells (DEP GIS dataset, 2006) categorized by site status—Active, Inactive, Abandoned, Proposed but Never Materialized
Where we’re at now

Sample of student & faculty pathways
Bethany Dunn, English/History ‘13
- FOUN099, ‘Blue Highways’ (foundation seminar)
- GIS/video project for Environmental Res College
- GEOG204, Applied GIS
- HUMN272, Nature & Human Enlightenment
- Mellon-funded student research assistant collaborating with Prof. Katie Faull and Prof. Alf Siewers on research for ‘Stories of the Susquehanna’ project
- HUMN290, Susquehanna Stories (IP course)
- HIST000, Historical GIS (methods course)
- Senior honors thesis?
Getting GIS into...the social sciences

© Jorge Vargas, Environmental Studies/Geography ’12

- Susquehanna Summer Writer’s Institute
- Library & IT-funded GIS student assistant
- ENST302, Environmental Research (methods course)
- ENST255, Environmental Justice
- GEOL230, Environmental GIS
Rebekah Hupp, Civil Engineering ’13

- Engineering 101, Engineering Graphics
- Geology 230, Environmental GIS
- Engineering 320, Water Resources Engineering
- Engineering 421, Hydrology
- Engineering 490, Senior Design

McKenna-funded research assistant collaborating with Prof. Kevin Gilmore and I on using GIS to analyze potential air pollution impacts from frac water transport to Marcellus Shale wells in NE PA.
Embedded GIS: Amanda Wooden

**Year 1**
- GIS guest lecture in ENST 202 (GIS & Research Design)
- Collaborated on mapping survey data on env. activism in Kyrgyzstan
  - Student research assistants supervised by GIS specialist
- Presentation for faculty colloquium series

**Year 2**
- GIS guest lecture in ENST 202 (GIS & Research Design)
  - Added GIS lab: 'Human/Landscape Interaction: Marcellus Shale'
- Collaborated on mapping survey data on env. activism in Kyrgyzstan
  - Added spatial analysis of survey data
  - Jointly-supervised student research assistants
- GIS guest lecture in ENST 255 (GIS & Environmental Justice)
- Susquehanna Valley Summer Writer’s Institute
  - Web-based mapping application
- Introductory GIS workshop
- Multiple presentations & publications
  - Tenure year

**Year 3**
- All of the above
- Collaborated on mapping survey data on env. activism in Kyrgyzstan
  - Moving towards faculty member as primary GIS research supervisor
- Spatial Statistics workshop
- Multiple presentations & publications
What’s next

- I will get 2 pilot web map apps out this summer even if it kills me!
  - Teaching pilot - New Orleans IP course
  - Research pilot - ‘Stories of the Susquehanna’

- Tighter integration with course materials
  - Meeting specific learning objectives
  - Pre/post evaluation and student evaluations

- Figuring out how to get
  - Assistant for me
  - Web developer for academic projects
  - Course releases for faculty
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