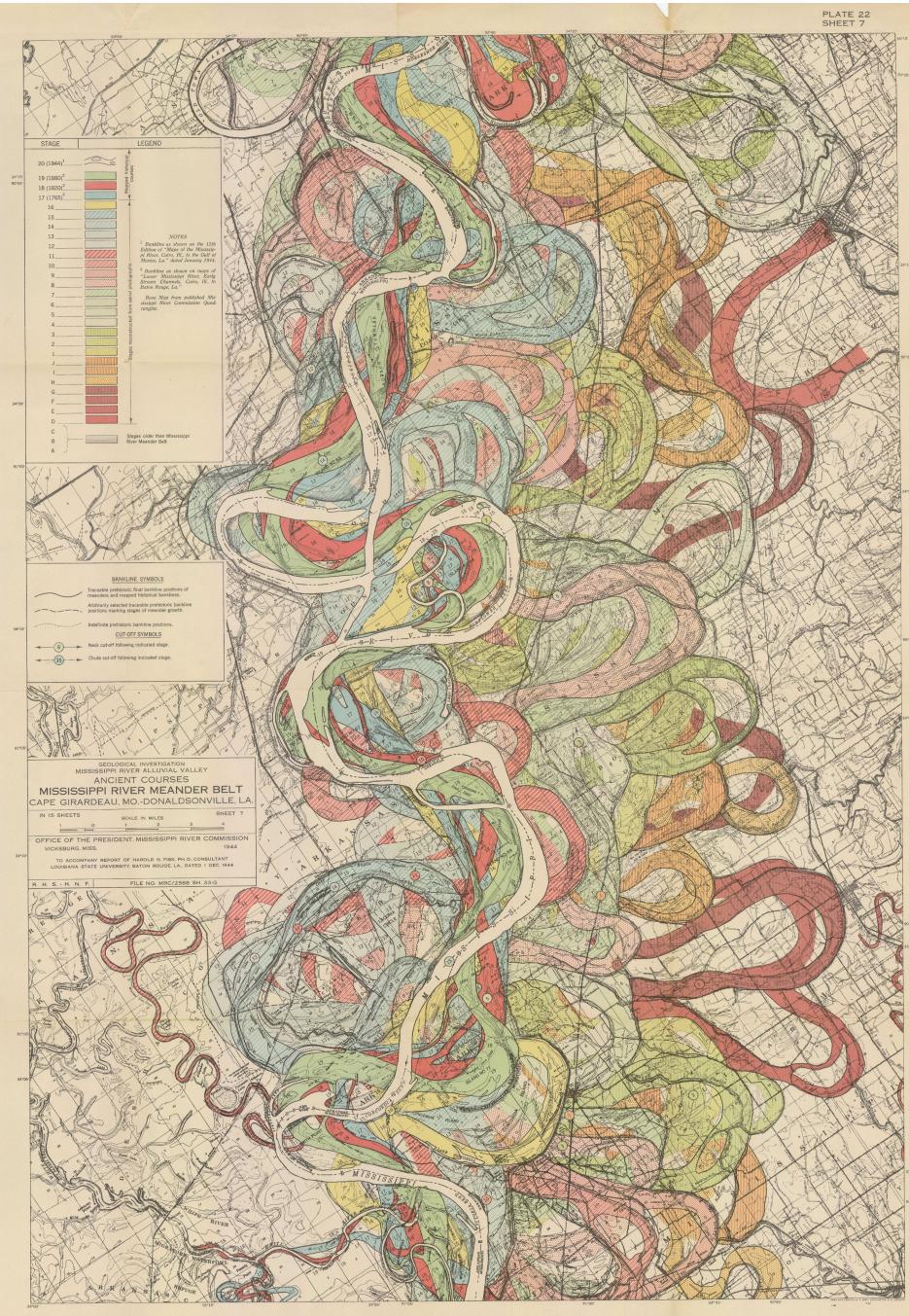
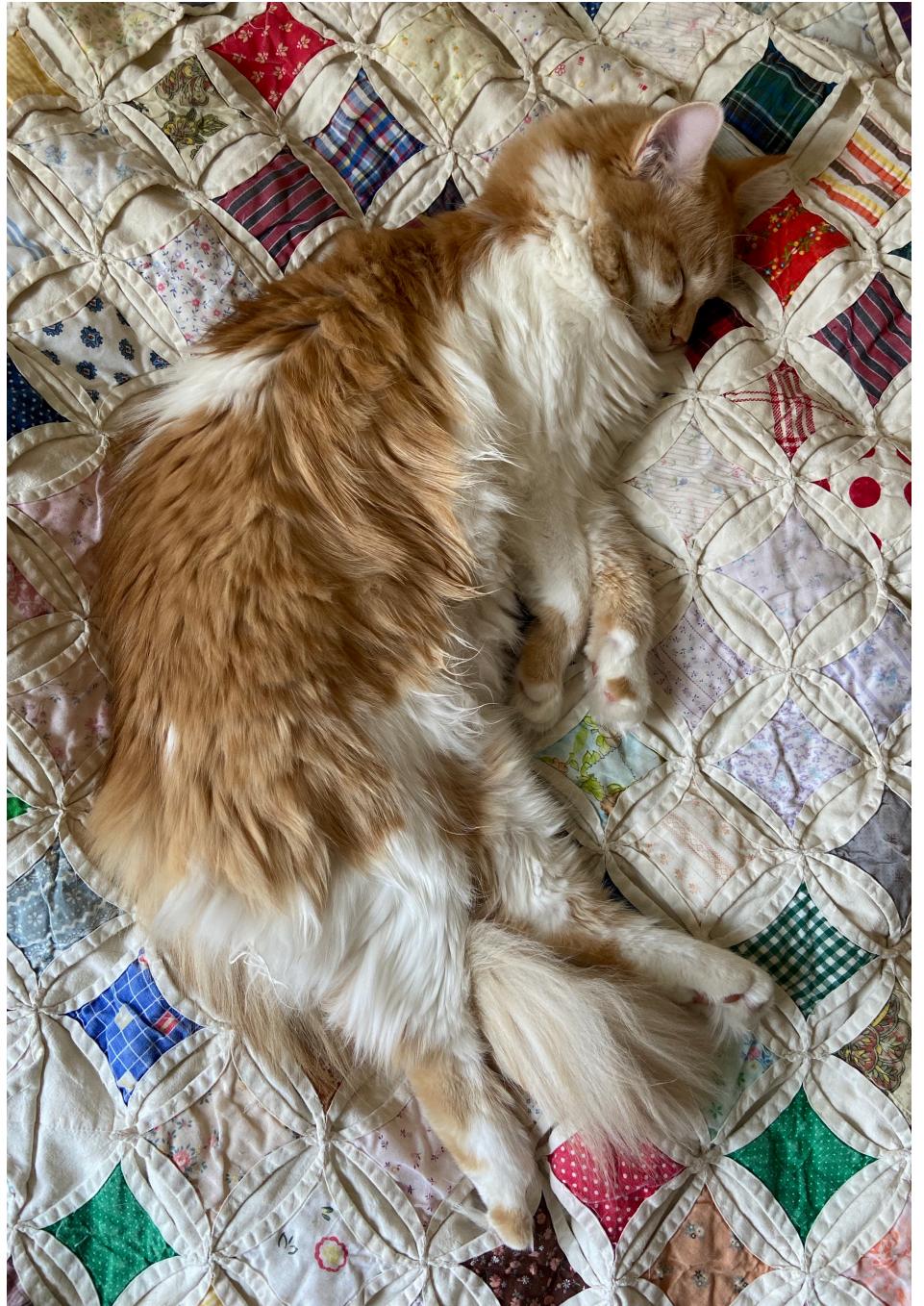


GEOG 358: Introduction to Geographic Information Systems Course Overview



Plan for today:

- Course overview:
 - Objectives
 - Content
 - Structure
- Introductions
- Applications of GIS



GEOG 358: Introduction to GIS

Fall 2021

Instructor

Elizabeth Jane Wesley
Office: 214B Lindley Hall
Email: ejwesley@ku.edu
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Class Meetings

MW 9:30-10:45
228 Lindley Hall

Lab Instructor

Emily Elder
Email: emily_elder@ku.edu

Lab Meetings

W 1:00-2:50
F 11:00-12:50

Course Objectives

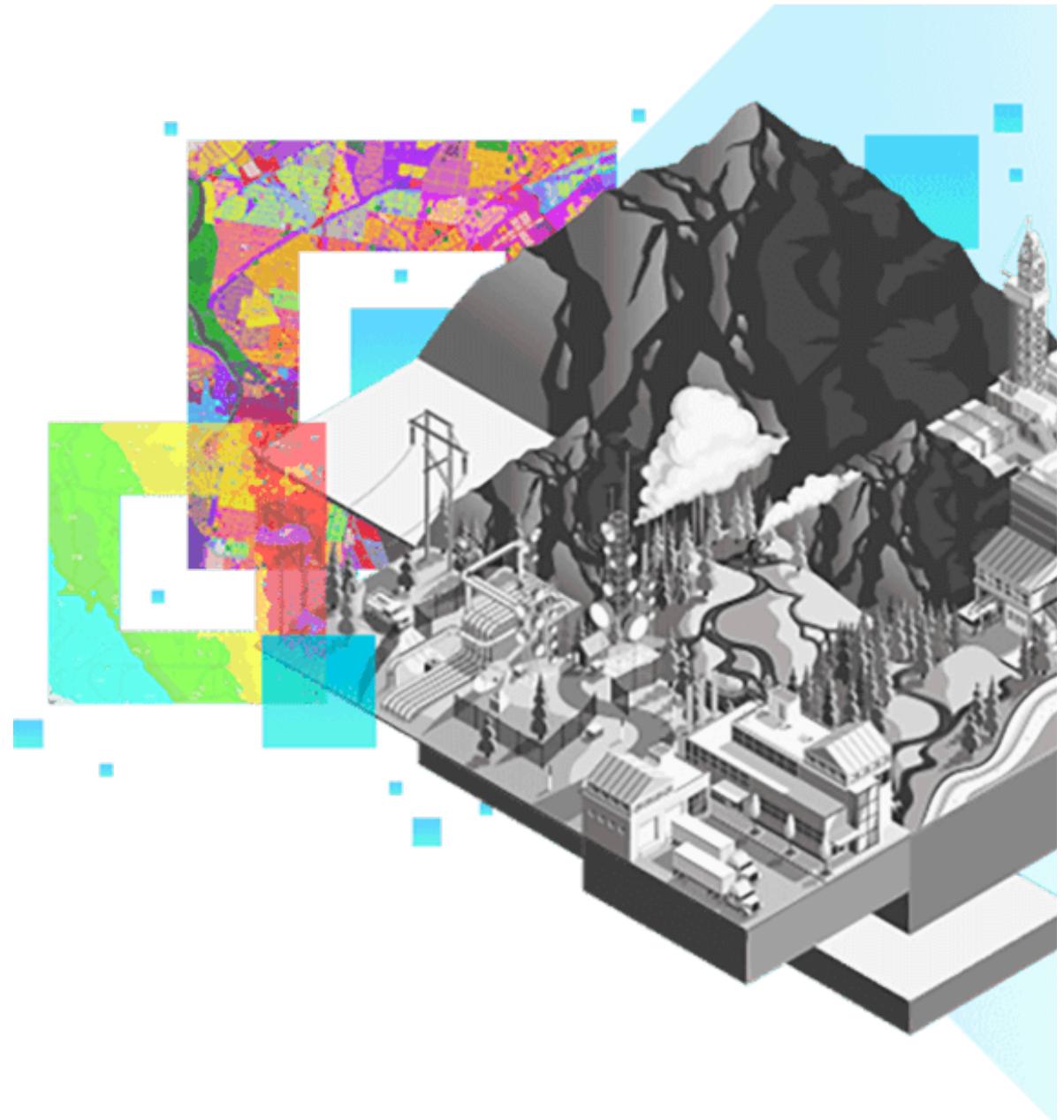
Fundamental GIS concepts

- Coordinate systems
- Map projections
- Data models
- Spatial data collection
- Visualization
- Spatial analysis



Practical experience

- GIS software
- Data management
- Cartography
- Communication
- Application



Spatial thinking

- Spatial variation
- Pattern
- Form & function
- Spatial perspective
- Critical thinking
- Location



Course Content

- Introduction to GIS
- Coordinate systems, datum, map projections
- Data models, structures, and files
- GIS data collection
- Cartography
- Vector Data Analysis
- Raster Data Analyses
- Spatial interpolation
- Terrain analysis

Course Structure

Evaluation

- Mid-term exam: 25%
- Final exam: 25%
- Labs: 50%

Exams

- Mid-term exam will cover the first half of materials
- Final exam will focus on the second half

Textbook

Bolstad (2019) GIS Fundamentals: A First Text on Geographic Information Systems (6th Edition), XanEdu. (required)

- Digital copy has color figures!

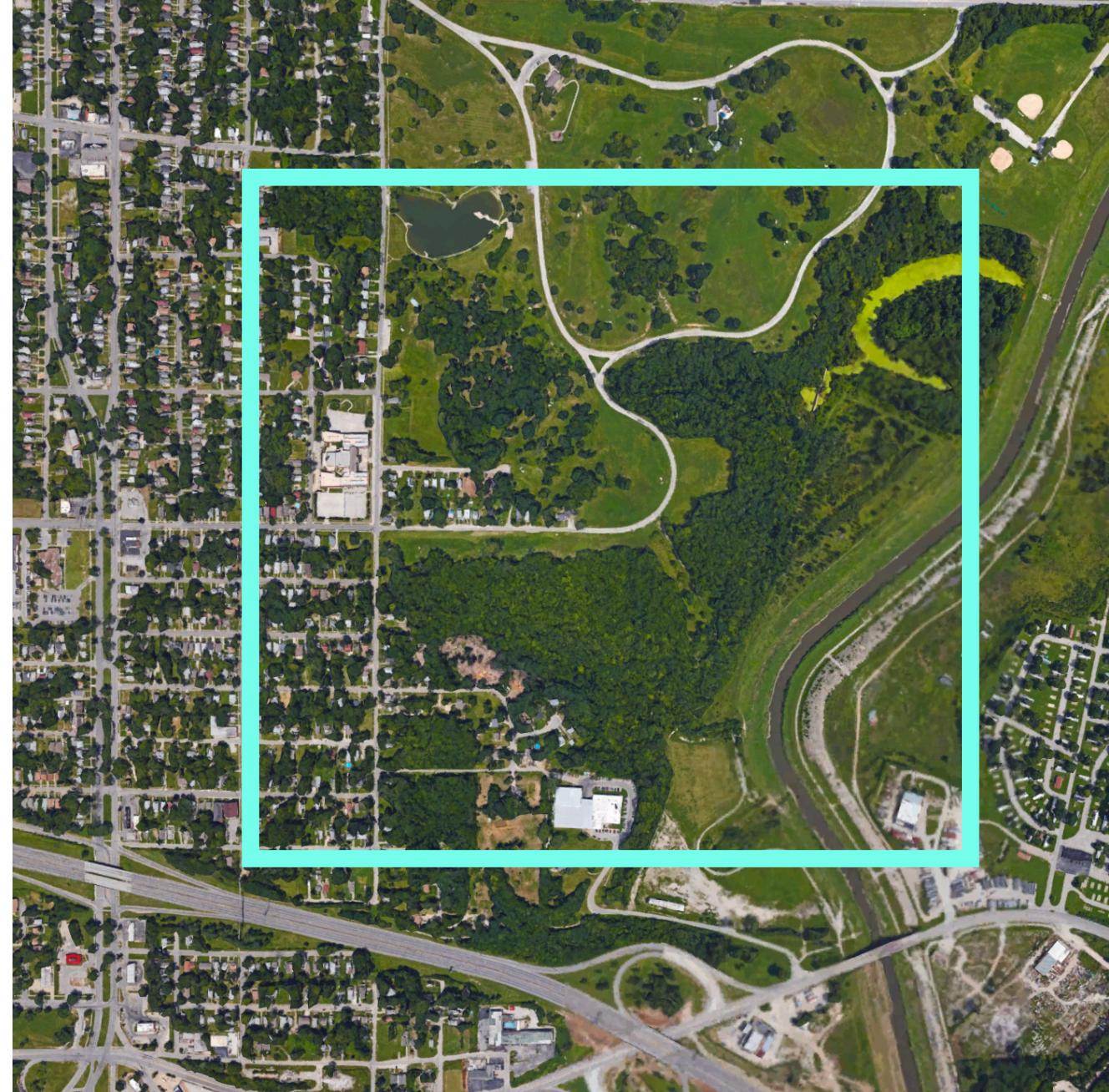
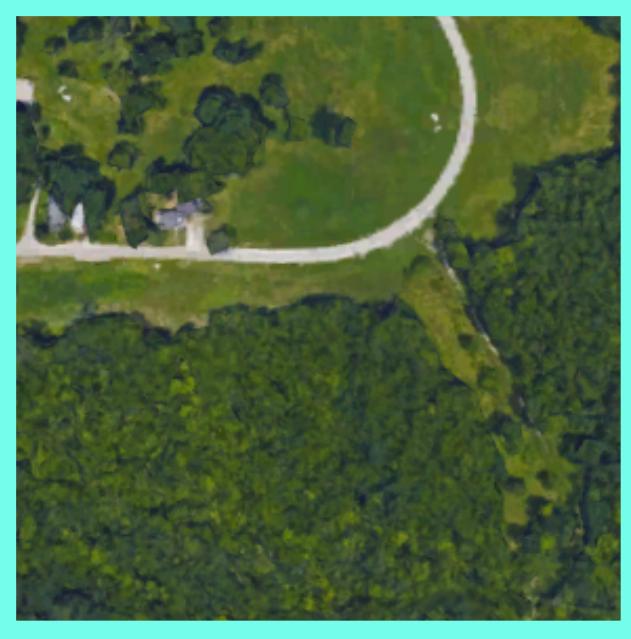
Software

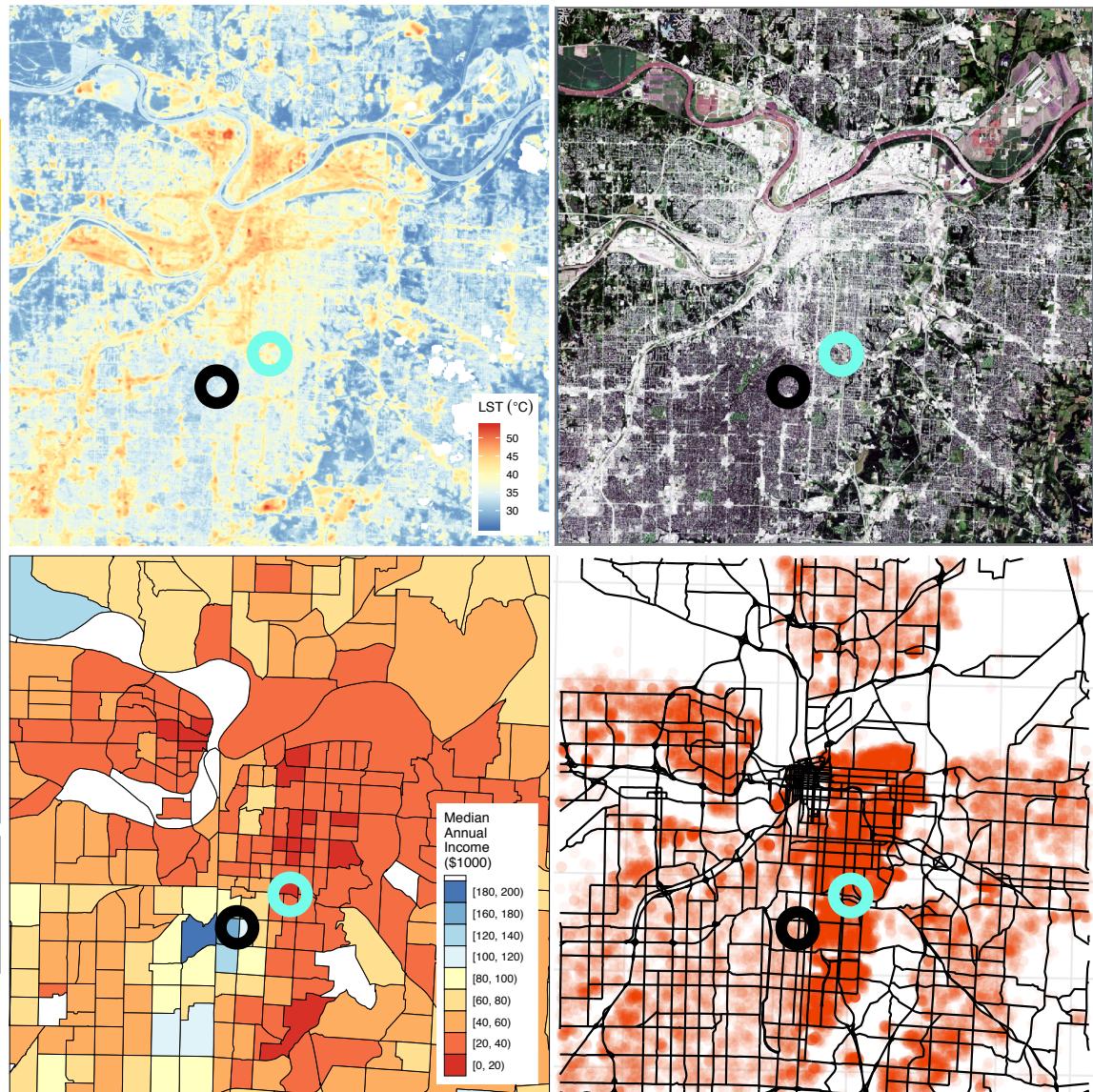
- ArcGIS Pro and ArcGIS Desktop
- Free for KU students with a campus-wide site license
- Available at kusoftware.ku.edu
- Extensions (authorization needed)
- Only runs in a Windows environment
- GTA will be available this week to help you install ArcGIS Pro or access it through VirtualLab



Introductions







Applications

URBAN PLANNING

- GIS helps surveyors and engineers design, map and expand cities.
- Planners can analyze existing cities with the spatial query and mapping functions of GIS.

GIS TECHNOLOGY IS APPLIED TO:



SMART CITIES

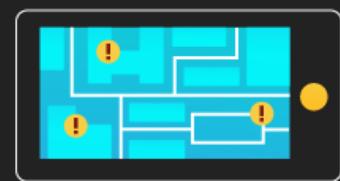
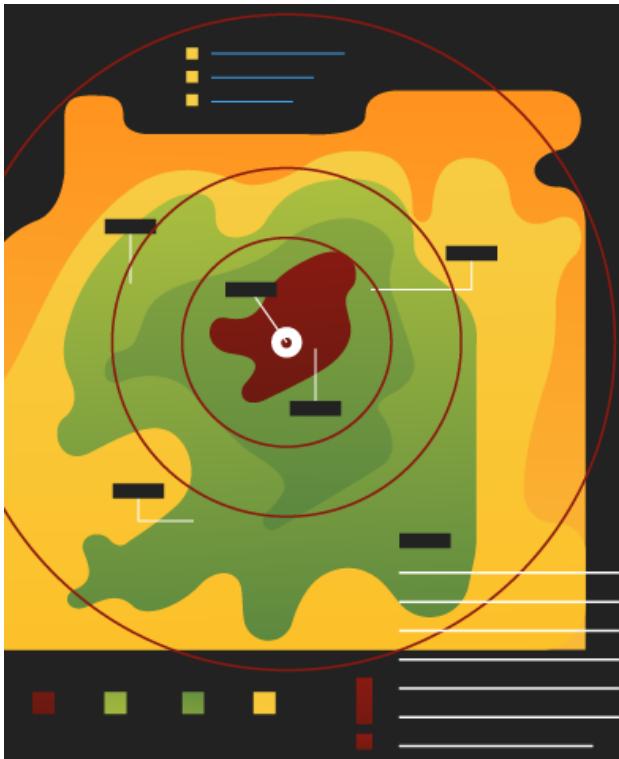
Smart cities rely on spatial data to guide the development of infrastructure and services, creating a more sustainable, transparent and efficient environment.



ACCESSIBILITY

Analysts use GIS technology to plan urban growth that is more accessible for people with limited mobility or vision.





CROWDSOURCED DATA IN RESCUE OPERATIONS

- Crowdsourced maps can help rescuers locate people who are trapped.
- In places where maps aren't complete or updated, volunteers can add missing landmarks such as buildings, roads and bridges.

DISASTER RESPONSE

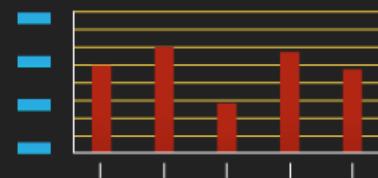
In the case of disasters—both natural and manmade—geospatial intelligence provides experts, leaders and rescue teams with important data to assess risk and aid rescue efforts.

GIS TECHNOLOGY IS APPLIED TO:

HAZARD MAPPING

GIS technology can accurately identify areas subject to hazards such as:

- | | |
|---------------|-----------------|
| ▪ Hurricanes | ▪ Wild fires |
| ▪ Earthquakes | ▪ Tornadoes |
| ▪ Floods | ▪ Winter storms |



MORE ACCURATE DAMAGE ESTIMATES

After disaster strikes, GIS can show areas of critical damage, predict transportation and evacuation problems and estimate the number of people affected.

MILITARY

There are several notable applications of GIS in the military including terrain evaluation, weather information, campsite management and operations on land, sea and air.

GIS TECHNOLOGY IS APPLIED TO:

DEFENSE SITE MAINTENANCE

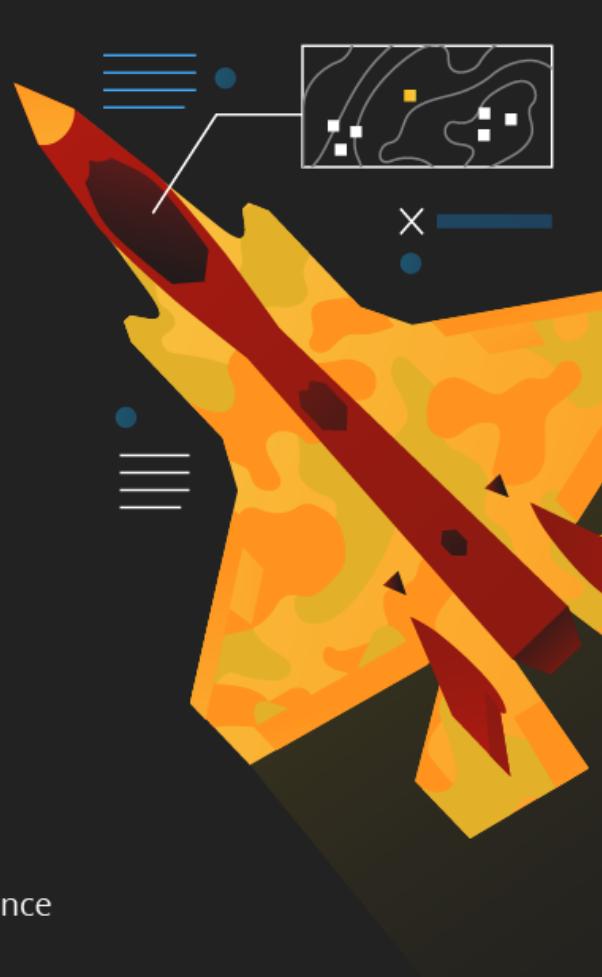


Military land and facilities managers can use GIS to improve communication, reduce operation and maintenance costs, and analyze alternative strategies.

INTELLIGENCE



Militaries can use GIS to integrate intelligence, surveillance and reconnaissance to better inform operations.





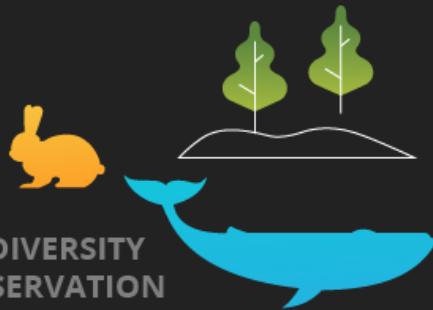
NATURAL RESOURCE MANAGEMENT

Smart maps and spatial analysis can help manage natural resources.

ENVIRONMENTAL PRESERVATION

Scientists and environmentalists use GIS technology to make better decisions about the environment and map their conservation-management strategy.

GIS TECHNOLOGY IS APPLIED TO:



BIODIVERSITY PRESERVATION

Scientists use GIS data to measure biodiversity and analyze the geographic distribution of endangered species as well as minimize the negative impact of developing and construction on certain habitats.

HEALTHCARE

Healthcare professionals use GIS technology to evaluate programs, improve access, keep costs down and treat and prevent disease.

GIS TECHNOLOGY IS APPLIED TO:



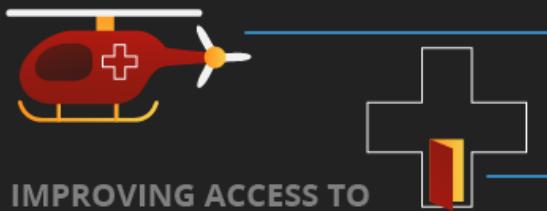
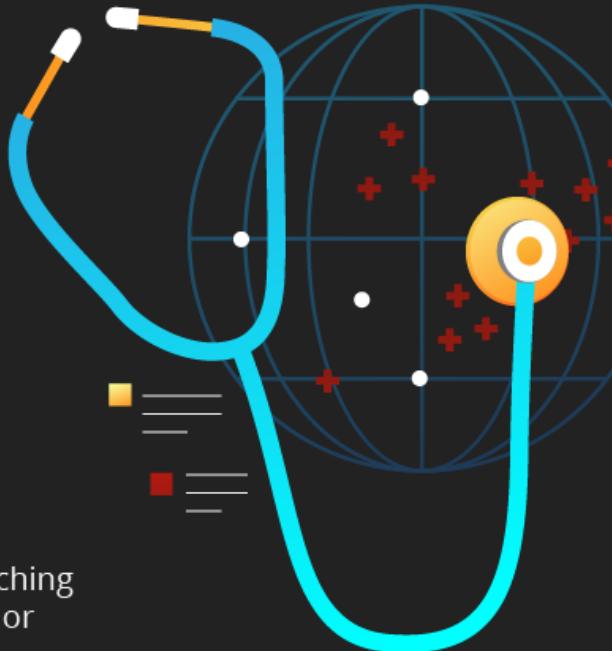
MATCHING SERVICES TO NEED BY HOSPITAL LOCATION

GIS can significantly improve care by matching physician locations to where patients live or work, which ensures that primary care physicians—and certain specialties—are available to the populations that need them.



DISEASE AND HEALTH TRACKING

GIS can be used to analyze the spread of infectious diseases and help manage treatment of high-risk populations.



IMPROVING ACCESS TO HEALTHCARE

Geospatial technology can help patients gain access to the care they need—for instance, the Veterans Health Administration (VHA) and the Planning Systems Support Group (PSSG) help enrollees find the nearest VA primary, secondary and tertiary sites of care.

MARKETING

Marketers can use GIS to better target audiences and locate concentrations of people who are more likely to buy a service or product.

GIS TECHNOLOGY IS APPLIED TO:



LOCATION-BASED MOBILE NOTIFICATIONS AND PROMOTIONS

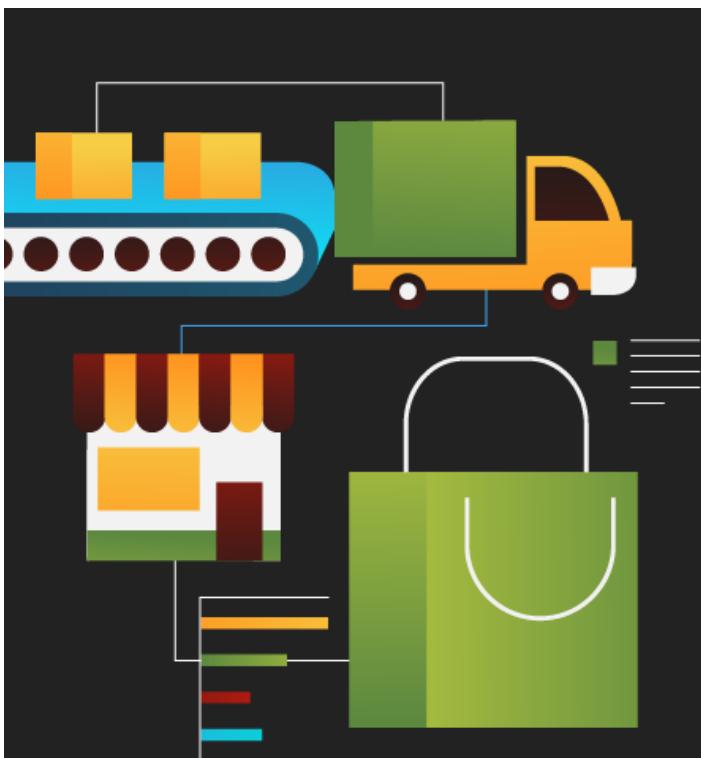
Companies can use geofencing to send location-based push messages to people in specific locations.



In a study that surveyed more than **200** business executives, data analysts and business analysts, researchers found that nearly all medium and large organizations collect and store location data.



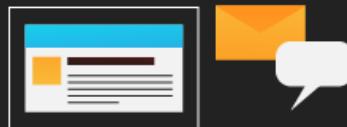
More than **8 in 10** C-level and management-level respondents said they are very or extremely likely to invest in location intelligence within the next three years (**84%**).



BUSINESS ANALYTICS

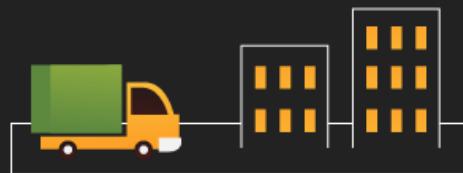
Spatial analytics can help organizations discover patterns that influence business decisions, optimize supply chain management and make complex predictions.

GIS TECHNOLOGY IS APPLIED TO:



SUPPLY CHAIN MANAGEMENT

Companies can use GIS tech to accurately track their assets from supplier to consumer.



LOGISTICS

GIS can help address logistics and transportation problems—from route planning and navigation to improving efficiency and environmental friendliness.



RISK MANAGEMENT

GIS data can help businesses assess and locate risk as well as make more informed exposure management plans.

Readings

- Chapter 1

Lab

- Install ArcGIS Pro on your personal computer
- Access ArcGIS Pro through KU VirtualLab