Geography 360: GIS & Mapping

Course Introduction

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Outline

- **Personal Introductions**
- **Course Goals & Outline**
- **Class Syllabus**
- **Tips**

Introduction

- **<u>Education</u>:**

  Ph.D., *Geospatial Information Sciences (GIS),* UTDallas

  M.S., *Geospatial Information Sciences (GIS),* UTDallas

- **<u>Research Interests</u>:**

  - Spatial Optimization, Geocomputation, Spatial Statistics, Spatial Analysis and Modeling.

  - GIS applications for disaster mitigation and emergency management.

  - Most recently I have been developing spatial optimization algorithms for mitigating wildfires.

Introduction

- *Annals of the American Association of Geographers*
- *Transactions on GIS*
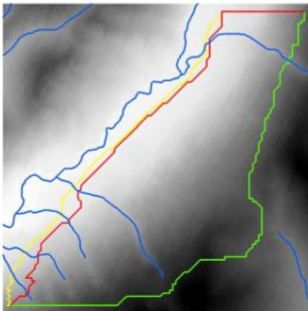- *Geocomputation*

620   D Dean, V Thakar and N Sirdeshmukh

Figure 4   Examples of optimal routes derived from the vector (green), buffered (red) and unbuffered (yellow) approaches
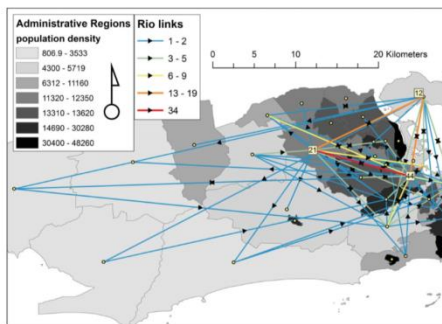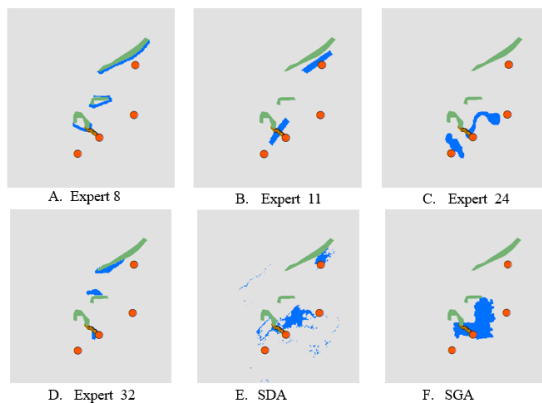
Figure 1.   All social network chains in Rio de Janeiro superimposed on population density (km²). The yellow text boxes indicate the number of internal links with a polygon. (Color figure available online.)

Fig. 2   RDS respondent count per administrative region of Rio de Janeiro

2016, Optimal Routefinding Across Landscapes Featuring High-cost Linear Obstacles.
Transactions on GIS

2016, Spatial Autocorrelation and Qualitative Sampling The Case of Snowball Type Sampling Designs.
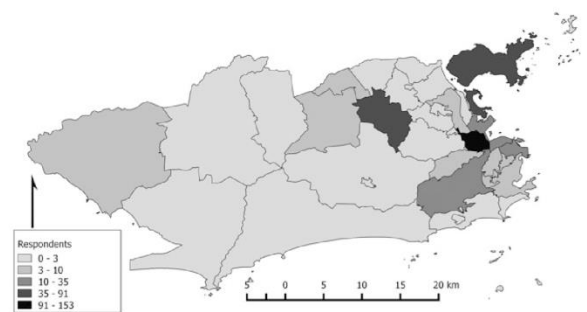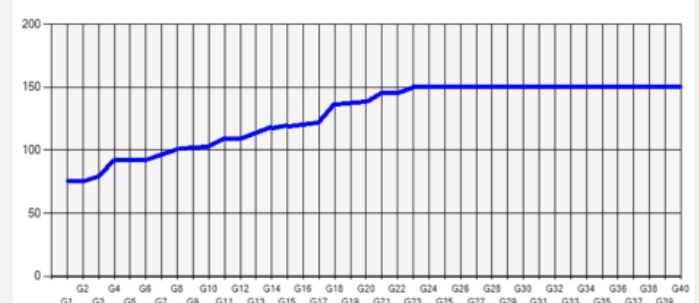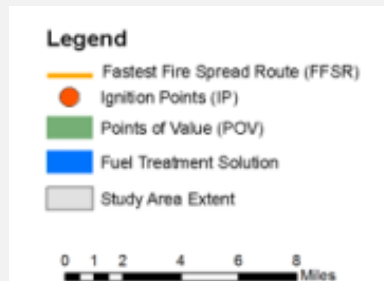*Annals of the American Association of Geographers*

2015, Respondent-Driven Sampling and Spatial Autocorrelation.
Geocomputation

A. Expert 8   B. Expert 11   C. Expert 24
D. Expert 32   E. SDA   F. SGA

Legend
- Fastest Fire Spread Route (FFSR)
- Ignition Points (IP)
- Points of Value (POV)
- Fuel Treatment Solution
- Study Area Extent

A. Fitness of best solution

A Spatial Optimization Approach to Finding Locations for Wildfire Fuel Treatments.
Forthcoming

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Contact Information

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Office Location	Smith 416 C	Smith 401	Smith 417
Office Hours:	Wednesday, 4:15 p.m. - 5:00 p.m. OR by appointment.	Thursday, 12:30 p.m. - 1:30 p.m. OR by appointment.	Thursday, 10:30 a.m. - 12:00 p.m. OR by appointment.
Sections Assisting	AA, AB, AC, AD	Section AA & AC	Section AB & AD

- Please start the subject line of each **email** with **GEOG360.**
- **Response time** will likely be around **24 hours**, so try to plan ahead with time sensitive questions.

Let us know about DRS accommodations – we are here to support each of you.
https://depts.washington.edu/uwdrs/

Introduction : Your Turn

In groups answer :

- Name, Major, Year (e.g., freshman)
- **Experience in GIS (Software, Concepts, Courses taken, Internship)?**
- What brought you to this class?
- **What technology skills do you have so far?**
- What intellectual or practice questions do you want to answer about mapping, GIS, or technology?
- What do you want to get out of this class?

- **Assignment 00 (10 Points):**

  In a word document, write down answers to these questions individually and submit your word document on UW Canvas.

Topic Coverage - Geography 360: GIS & Mapping

Part 1: Visual arguments

- Week 1: Introduction to Course & Introduction to GIS
- Week 2: Introduction to Cartographic Principles
- Week 3: Geographic Data Modeling

Part 2: The origins and ends of data

- Week 4: Data - Introduction to Data Models and Databases
- Week 5: Data - Data and Geovisualization Strategies

Part 3: Spatial Calculations

- Week 6, 7 & 8: Introduction to Spatial Analysis (Algorithms, Spatial Operations, Analysis)
- **Week 6: Exam 1**

Part 4: Spatial Arguments

- Week 9 : GIS, Mapping, and Society
- **Week 10: Final Exam**

Course Goals: Conceptual

LECTURES

- Develop an understanding of the history of mapping.
- Develop an understanding of cartographic and mapping principles.
- How do we transform a 3D globe into a flat surface?
- What symbolization strategies are most effective at achieving a particular goal with a map?
- Gain knowledge of current options in geospatial technologies.
- Recognize that maps do not tell the truth, but only one aspect of the truth.
- How do we read a map so that we understand its bias?
- How do we create a map so that it emphasizes the aspect of the world we want to highlight?

Course Goals: Technological

LABS: Emphasis on much broader range of technologies

- **ESRI ArcGIS Online** (Web Mapping)
- **Field Papers** (Georeferencing)
- **GeoJSON** (Web Mapping)
- **ESRI ArcMap** (Desktop Mapping)

Course Goals: Curricular

- **Gateway to other GIS courses in the department**

  https://www.washington.edu/students/crscat/geog.html

  381 – Maps and Health

  426 - Advanced Quantitative Methods

  458 – Advanced Digital Geographies

  461 – Urban Geographic Information Systems

  462 – Coastal GIS

  464 – GIS-Based Decision Support

  465 – Databases and Programming

  469 – GIS Workshop

  482 – GIS Data Management

- **Building employable skills**
- **But, also potential to bridge into non-GIS subjects and geography courses**

Introduction : UW Canvas

Syllabus: Where to Find Things

Everything can be found on the course [Canvas site](#)

- **Syllabus** (Readings, Labs Assignment, Labs due, Exams)
  - Required Readings (all scans and links – no need to buy anything).
- **Lecture Notes**
  - Access Lecture Presentations.
- **Assignments : Labs and Exams**
  - Access GIS lab instructions & data.

Books (no need to buy anything)

- **Readings (all scans – no need to buy anything)**
- **LG (4th Edition) : Online version available in library**
- **LC (4th Edition) : Print version available in library**

▪ Longley, P., M., Goodchild, D. Maguire, and D. Rhind, 2015, *Geographic Information Systems & Science*, **4th edition,** John Wiley & Sons, ISBN: 978-1-118-67695-0 [**LG**]

◆ Law, M. and A. Collins, 2015, *Getting to Know ArcGIS* (for ArcGIS 10.2 and 10.3), **4th OR 5th edition**, ESRI Press, ISBN: 978-1- 58948-382-8 [**LC**]
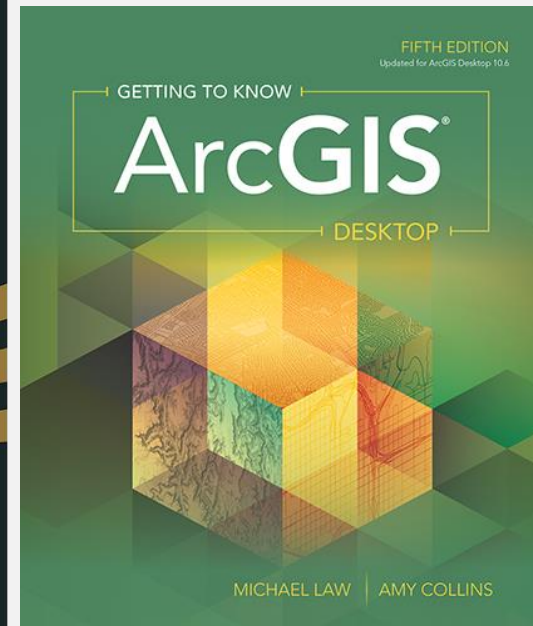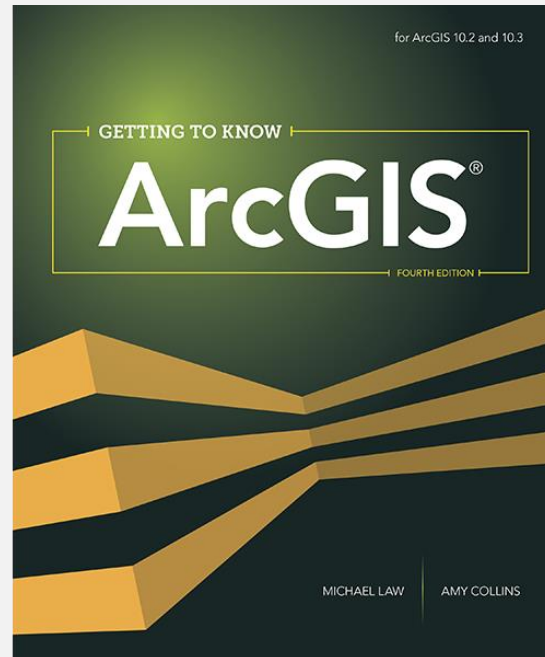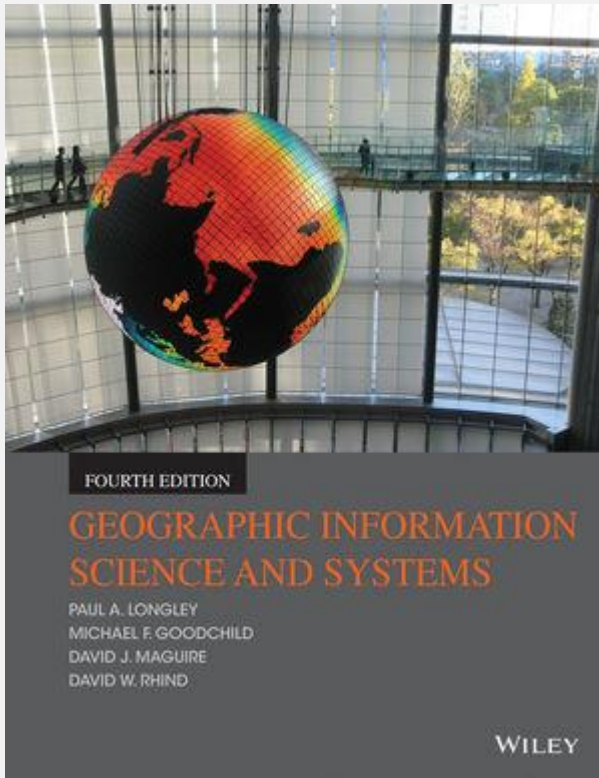
Course Syllabus

Lecture and Lab Schedule:

Week	Day	Date	Topics	Readings (Required)
			Introduction to Mapping	
	Monday	1/7	Course Introduction	
1	Tuesday	1/8	No Lab	
	Wednesday	1/9	Introduction to GIS	Longley et al. 2011, Chapter 1
	Thursday	1/10	Lab 01 Assigned	
	Friday	1/11	Representing Geography	Longley et al. 2015, Chapter 3 ⬈
			Introduction to Cartography	
	Monday	1/14	Georeferencing I	⬈
2	Wednesday	1/16	Georeferencing II	
			Geographic Data Modeling	
	Friday	1/18	Data and Databases I	⬈
	Lab 1: Introduction to Web Mapping Assigned (Due on Jan 24 before 5:00 p.m.)			
	Monday	1/21	**Martin Luther King Day (Observed - No Class)**	

3	Wednesday	1/23	Data and Databases II	⬈
	Friday	1/25	Data Quality	
	Lab 2 Basemap Tutorial Assigned (Due on Feb 05 before 5:00 p.m.)			
			Introduction to Data Models and Databases	
4	Monday	1/28	Data Collection I	
	Wednesday	1/30	Data Collection II	
	Friday	2/1	Databases	
	Lab 3 Mapping Carbon Footprints Assigned; **Lab 1 Due**			
			Data and Visualization Strategies	
5	Monday	2/4	Cartography and Map Production I	
	Wednesday	2/6	Cartography and Map Production II	
	Friday	2/8	Exam 1 Discussion	
	Lab 4 Simply Seattle Assigned; **Lab 2 Due**			
			Introduction to Analysis	
	Monday	2/11	Exam 1	

Grading

- **50 % Labs**
  - Late lab submissions will be penalized 10% per day late.

- **40 % Exams**
  - 20 % Exam 1 (Week 6, Monday, February 11)
  - 20 % Final Exam (Week 10, Friday, March 15)
  - **Request for DRS Accommodations**

- **10% Class Participation**

Grading

- **50 % Labs**
  - Late lab submissions will be penalized 10% per day late.

Labs

- GIS lab sections will focus of **implementation of GIS concepts from lectures**.
- **Lab sections:** GIS Labs will be divided into sections. Know your section and time!
- **via Canvas:** Access lab instructions and submit completed lab assignments.
- **Due dates:** Approximately 2 weeks. Exact due dates can be found under assignments posted on canvas, which will be updated every week.

Meetings: Lectures ECE 125 : MWF 11:30 a.m. – 12:20 p.m.

Labs SMI 401: Section AA   TTh 8:30 a.m. – 9:20 a.m.

SAV 117: Section AB   TTh 8:30 a.m. – 9:20 a.m.

SMI 401: Section AC   TTh 9:30 a.m. – 10:20 a.m.

SAV 117: Section AD   TTh 9:30 a.m. – 10:20 a.m.

LABS (ArcGIS Online)

Labs: EXPECT an Email for ArcGIS Online Invitation

- **Email E.g. Subject**: "An invitation to join an ArcGIS Online organization, UW Geography" .
- **Don't think it's spam** or a phishing attempt.
- **Don't delete** the message, you will need this for activating your ArcGIS online account.
- **Don't use your phone/tablet, try on your laptop of lab computer.**
- Make sure you **log in using your UW account".**
- TA will help you with this during labs.

Grading

- **10 % Class Participation**

1. Students will bring A4 size blank sheet(s) to every lecture session.
   e.g. **MWF**, 3 lectures every week.
2. Write your Name, Section, Date, Day on every sheet(s). Staple if more than one sheet.
3. Students write down answers to all questions asked during each lecture session.
4. Students turn in the hard copy during the labs session to their TA.
   (**Monday, Friday** = Tuesday; **Wednesday** = Thrusday).
5. TIP: Take a picture on your cell phone/scan the sheets to create a digital copy and save before you submit them to your TA (in case you loose your paper copy).

GRADING

6. Every week, we will randomly select a day (M/W/F) and grade that sheet.
7. In total, this quarter has 10 weeks. Only 8 sheet submissions will count towards your final score (10%).
8. You are **allowed to miss maximum of 2 submissions** to accommodate days when you are not able to attend the lecture(s) e.g. medical or personal emergency.
9. NO late submission will be accepted. Zero points for late/no submission.
10. Important topics/questions and answers will be discussed in class during every lecture.

Syllabus: Norms and Rules

- **Respect one another.**
- **Monitor your speaking and invite others into conversations.**
- **Appropriate use of technology.**
- **Departmental rules, including Sherman Lab rules.**
- **University rules.**

Questions?

How to succeed in this class and beyond

Tip #1

- Tip: **Save your work a million times** more often than you think you need to.

- Rationale: Your **software will fail at the most inconvenient moment** possible. This will be true in the classroom, and it will be true at a job.

- How to do this: **Save things a lot**, and know where you saved them.

How to succeed in this class and beyond

Tip #2

- Tip: **Become a problem-solver.**

- Rationale: 50% of a **GIS job will be figuring out why things are broken**. Your software will break. Your data will break. Your scripts will break. Companies want to hire employees that are **ready to solve unexpected problems**... start developing that aptitude now.

- How to do this: We're absolutely here to support you. But, you might learn more if **you struggle through things a bit on your own before calling your TA** over to the computer. **Start things early**, and know that there are a lot of GIS forums online.

How to succeed in this class and beyond

Tip #3

- Tip: Strive to be **more than just a GIS technician**.

- Rationale: **GIS software** is a **tool**. You not only need to be able to use the tool, you need to be able to do something with the tool. **Combine GIS with topical expertise** in resource management, demography, ecology, forestry, emergency management, etc. to **put yourself ahead of folks that only know how to use the tool.**

- How to do this: There are **multiple opportunities**, including labs, to tie your own interests into the course.

How to succeed in this class and beyond

- **Tip #4 (For Labs)**

- **Once you have submitted your labs/document on canvas, try to download your submission and check if the document opens and the file is not corrupted.**

- **Submitting a corrupted file or incomplete submission will result in no points. Submitting the file again, after the due date will result in 10% penalty per day.**

Upcoming

- Tuesday (Jan 08): NO LAB Session.

- Wednesday (Jan 09): Introduction to GIS (Lecture).

- Thursday (Jan 10) : Lab 01 will be assigned.

- Thursday (Jan 10) : Submit Wednesday's Class Participation sheets to TA.

- Start the readings (On canvas, under **syllabus**, check 'Readings' column under 'Lecture and Lab Schedule).

- Submit Assignment 00, self introduction on canvas.

Questions ?

https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwihuqvgkpjcAhU3tDQIH2bq88QQjRx68AgBEAU&url=http%3A%2F%2Fwww.cityofrockhill.com%2Fdepartments%2Finformat
ion-technology-services%2Fmore%2Finformation-technology-services%2Fgeographic-information-systems-gis-%2Fgis-frequently-asked-questions&psig=AOvVaw2fEUXAljbIY26W-
bnjS0w1&ust=1531436220322313