GEOG 4GA3
Applied Spatial Statistics

School of Geography and Earth Sciences
McMaster University

Antonio Páez

What is spatial statistics?

Applications of spatial statistics

- Geosciences
- Ecology
- Economics
- Business intelligence
- Policy analysis
- Transportation planning
- Etc.

Applied spatial statistics @ Mac

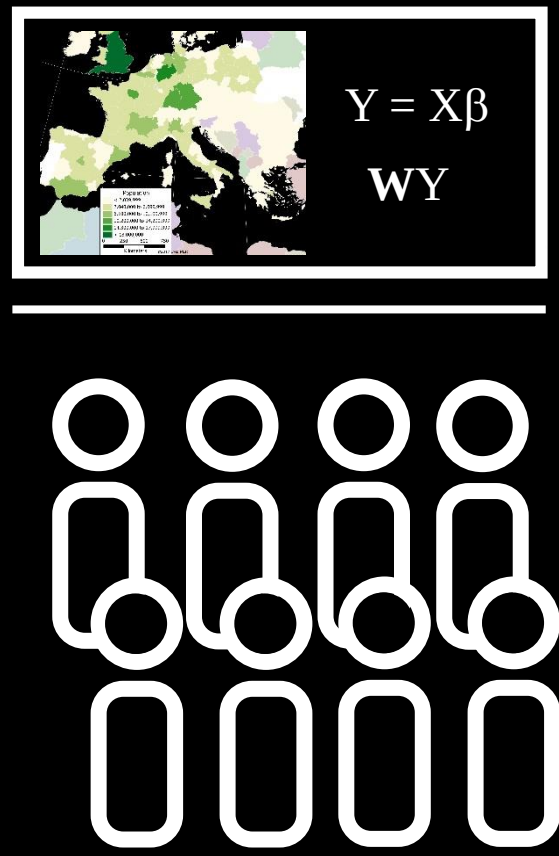
- Complement to GIS suite of courses
- Follow up to GEOG 3MB3: Emphasis on spatial data and effects

Applied spatial statistics @ Mac

- Instructors
  - Antonio Páez
  - Patrick De Luca
- Style of course
  - Flipped classroom
  - Literate programming

What is a flipped classroom?

Traditional classroom



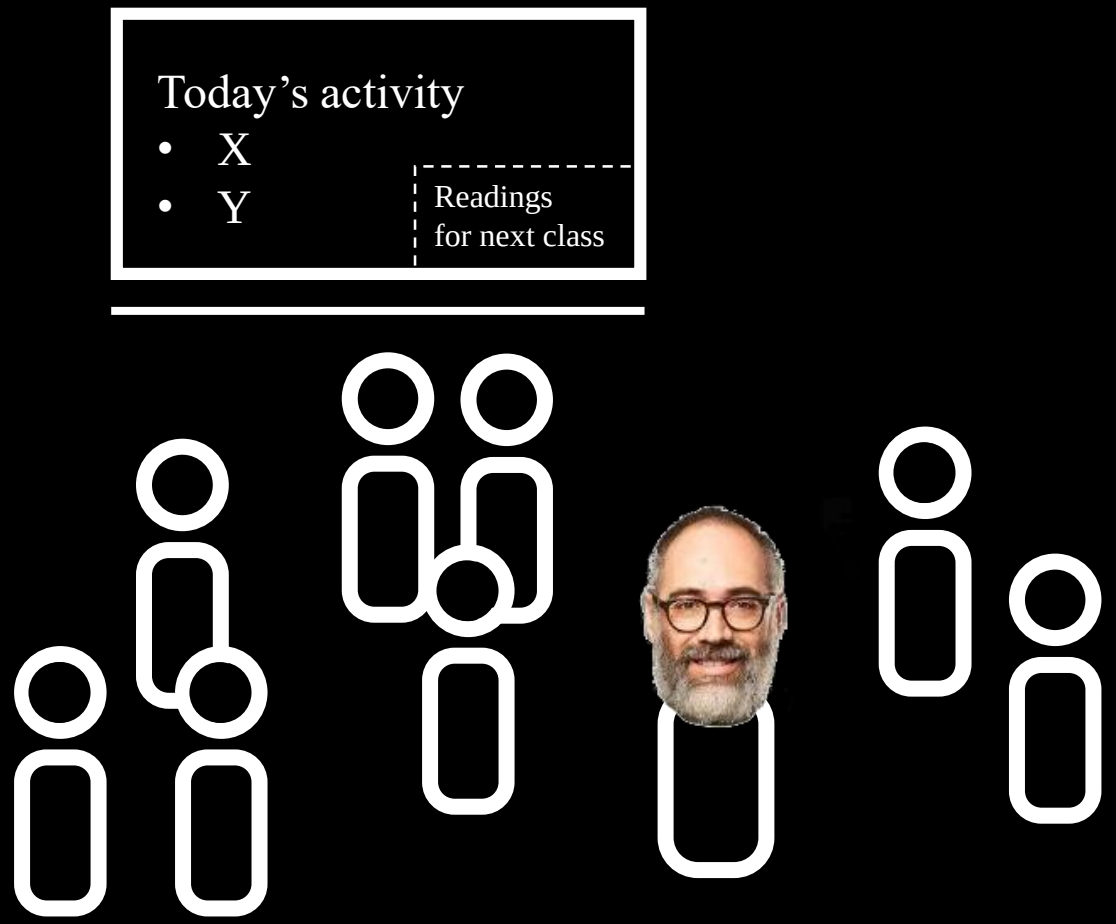
Instructor is:

- Performer
- Entertainer
- Sage
- Granter of wisdom

Traditional classroom

- Class time is used by the instructor to deliver contents, typically in a lecture format
  - Instructor is responsible for delivering contents
- Students read/cover materials outside of the classroom after each session (in the form of homework, assignments, etc.)
  - Students are responsible for understanding contents
- Verification of compliance happens periodically, in the form of examinations/graded assignments

Flipped classroom



Instructor is:

- Expert
- Guide
- Partner

Flipped classroom

- Students read/cover materials outside of the classroom prior to each session
  - Students are responsible for understanding contents

  https://paezha.github.io/applied_spatial_statistics/index.html

- Class time is used to engage with concepts in a collaborative way
  - Instructor is responsible for verifying compliance by solving issues, clarifying concepts, assisting with activities

- Further verification of compliance in the form of examinations/graded assignments

Structure of a session

- Initial 5-10 minutes will be used for a mini-lecture to provide a high-level view of threshold concepts, and to discuss readings/practice, clarify concepts, etc.
  - To optimize the use of time, take notes when you are completing your readings/practice, bring specific questions to the classroom
- Next 30-35 minutes will be used for an in-class activity
  - This may include discussion, problem-solving, or an exercise
- Last 5-10 minutes will be used for discussion of the activity

Suggested workflow (see outline)

- Check Readings and Practice
  - These are your assigned contents for the following session

- Check In-class Activity
  - This will be the activity for the class

What is literate programming?

Traditional programming

- Code forms the core of a program
- Code is documented in natural language

Literate programming

- Explanations of process in natural language form the core of a program
- Code is used to support explanations

How will literate programming be implemented?

Literate programming

- The R Project for Statistical Computing
- An open source language for statistics and computing
- Free
- Convenient
- Powerful
- Has become a backbone of data science and thus is increasingly required by employers

Computers in classroom

- Bring your personal computer to the classroom
- Make sure that you have internet connectivity
- No computer? No problem

Suggested Readings

- Flipped classrooms

https://en.wikipedia.org/wiki/Flipped_classroom

- Literate programming

https://en.wikipedia.org/wiki/Literate_programming

- The R Project for Statistical Computing

https://en.wikipedia.org/wiki/R_(programming_language)

THE GIS LABS: BSB 331 & 332

About the Lab & GIS @ Mac

esri Canada | Centre of Excellence

- One of 12 Centres of Excellence for GIS across Canada
  - Opportunities for student recognition (Awards, Scholarships)
    - Esri Canada Higher Education Scholarship in GIS (Deadline March 20)
    - Esri Canada Young Scholar Award (Deadline February 28)
  - App Challenge 2020 and other competitions
    - https://www.science.mcmaster.ca/geo/gis/esri-canada-centre-of-excellence.html
  - Networking opportunities at User Conferences
    - GIS In Education and Research Conference (March 4,5 at UofT)

About the Lab

- Updated GIS Lab information can be found on the GIS Bulletin Board outside the labs
  - Up-to-date information about the Labs
  - GIS in the News
  - Program information
  - Employment Opportunities (including internships, Coops etc)

About the Lab

- Current Hardware Environment
  - Windows 2012 R2 Server
  - 52 Windows 10 x64 Clients

- Primary Software used this term
  - ArcGIS Pro 2.4.3
  - R and R Studio
  - GeoDa

Lab Software and Ownership Policies

- Academic Site License for ArcGIS Pro
  - You retain rights to your original work, but once course is done you have no rights to access the software in the GIS Lab, you must obtain additional permissions, or you can use the Map Library, OR
  - Can obtain a student version of ArcGIS (good for 1 year from activation date)
    - If interested, please download form from Avenue, fill it out and bring to Pat in BSB 331A

Lab Policies (1)

Lab Policies (2)

- FOR ACADEMIC USE ONLY!
- Primarily for: 3GI3, 3SR3, 4GA3, GEO 710, Arts & Sci 3AB3
- User Accounts are your own, please don’t share them
- Disk Storage is not provided, please use a USB drive
- Please be aware that PCs in the labs may need to be re-formatted from time-to-time.

Lab Policies (3)

- Reporting bugs with software/hardware
  - Please email any issues to Patrick DeLuca delucapf@mcmaster.ca
- Student access is available as long as the building is open.
- Login ID/Password
- Change password immediately upon first logon
- Room maintenance
  - Please keep the lab clean, remember you are on camera!

Lab Schedule

BSB331

	MON	TUE	WED	THUR	FRI
830					
930	4GA3 L02	3GI3 L03	3GI3 L04	GEOG 710	
1030					
1130					
1230		3GI3 L02	4GA3 L02		
1330					
1430	3GI3 L01	3GI3 L06	3GI3 L05		
1530					
1630					
1730					
1830					
1930					
2030					
2130					
2230					
2330					

BSB332

	MON	TUE	WED	THUR	FRI
830		Arts & Sci			
930				3SR3 L05	
1030					
1130					
1230					
1330					
1430		3SR3 L01		3SR3 L03	
1530					
1630					
1730					
1830					
1930					
2030					
2130					
2230					
2330					

Pat’s Office Hours

Patrick DeLuca's Office Hours (January - April 2020)

	MON	TUE	WED	THUR	FRI
830					
930	4GA3 L02			3SR3 L05	
1030		OFFICE HOURS		OFFICE HOURS	
1130					
1230			4GA3 L01		
1330	3GI3 Lecture			3GI3 Lecture	OFFICE HOURS
1430	OFFICE HOURS	3SR3 L01	OFFICE HOURS	3SR3 L03	
1530					
1630					
1730					
1830					

If you cannot make one of the above times, please make an appointment via email: delucapf@mcmaster.ca