

---

# Geo-Information Tools GRS20806

D. Tuia, A. Bergsma, J. Stuiver

v0.1, March 18, 2019



---

# 'Geotools' in a nutshell

---

We aim at

- giving hands-on skills in GIS tools
  - Knowing tools
  - How to use them
  - How to search for them
- Building an GIS application end-to-end for a case study of interest



---

# We aim at models that are

## **Reproducible**

Gain skills to manage and archive project/research results and a report on the methods used in a study

- Logic to structure your data
- Logic to structure your project components
- Logic about outputs nature and visualization

---

# We aim at models that are

**Reproducible**

AND

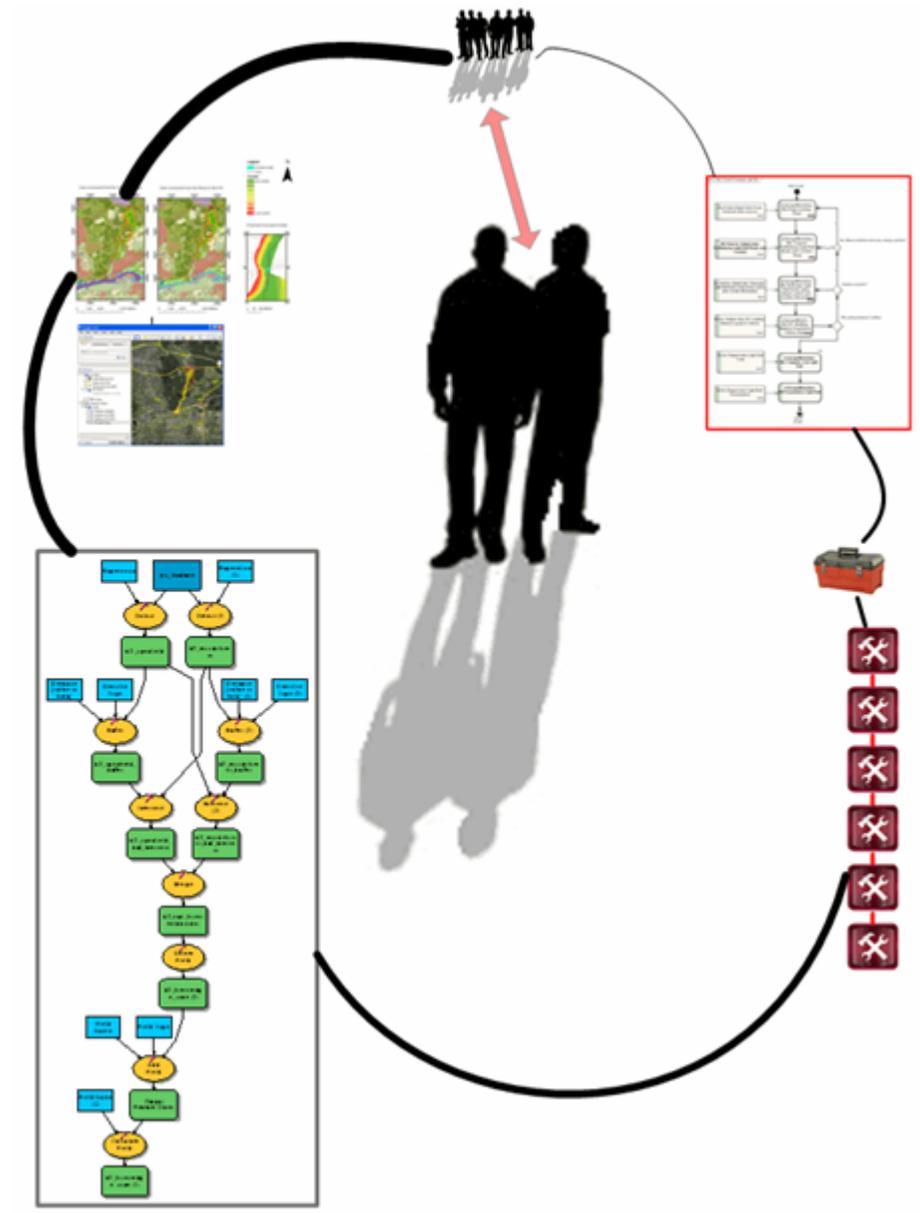
**Repeatable**

Create a workflow application to recalculate ALL results in the future and exchange applications and data between participants within studies

- Create an end-to-end model flow
- No hidden parameters
- Always produces the same result
- If not quantify uncertainties

# 4 elements of the course

- Approach / method
- Tools
- Graphical data-action models
- Visual outputs



---

# Approach / method

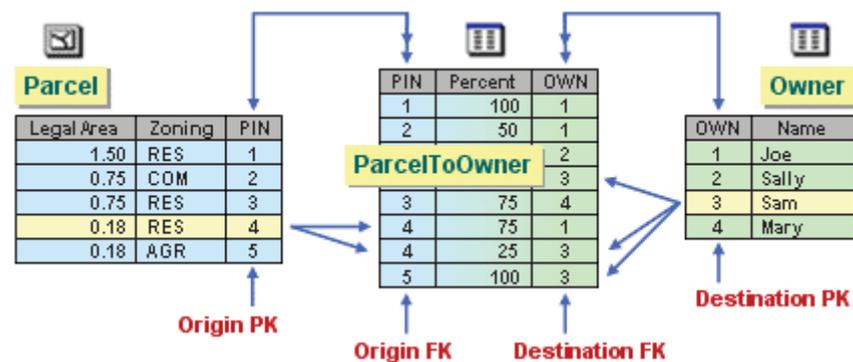
---

- We will talk about
  - how to structure a project
  - how to divide it into a sequence of components
  
- We will apply these concept to a single case study

*The light rail project, explained in the next module*

# Approach / method

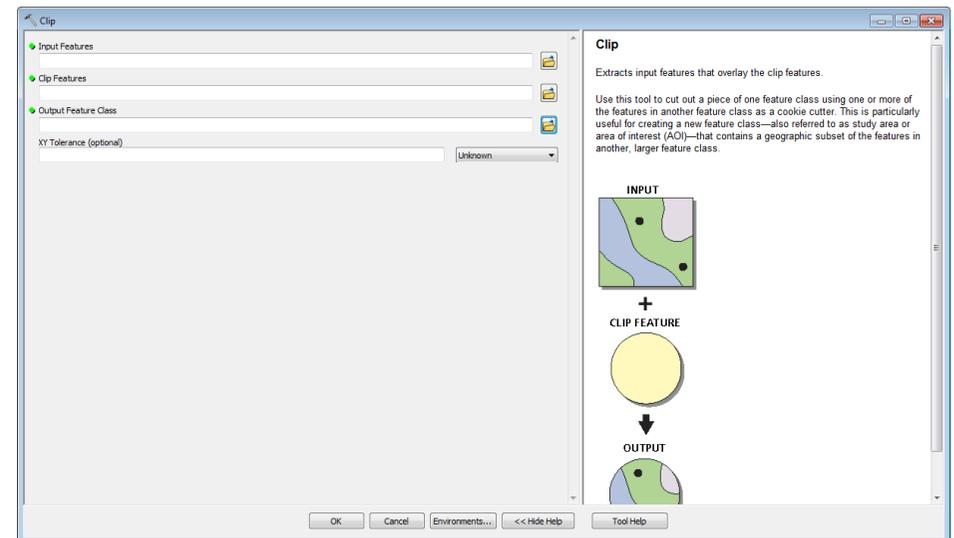
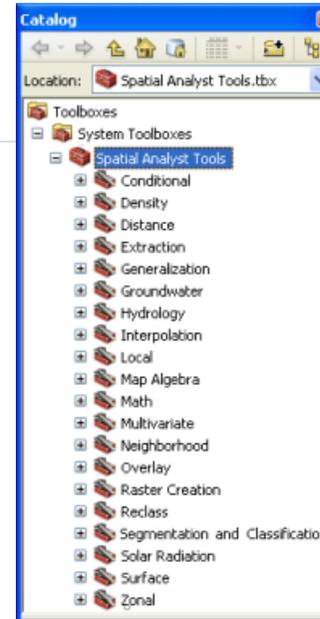
- Data need to be structured  
(otherwise you will experience problems further in the project)
- We will see how to name files to ease their retrieval
- How to create relations between them
- How to avoid creating unnecessary garbage



source: [gis.stackexchange.com](https://gis.stackexchange.com)

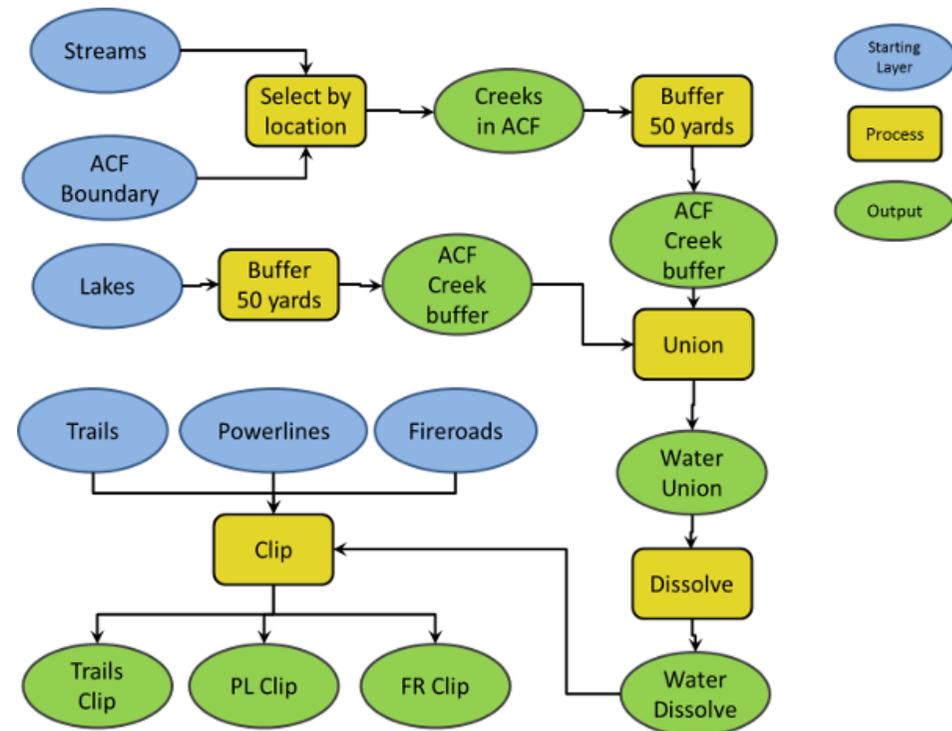
# Tools

- There are many tools
- You will learn some of them
- But also how to search for new ones
- And how to understand them and their parameters



# Data/action models

- Knowing data and tools, we need to connect them through processes
- Data action models increase reproducibility
- But many paths are possible for the same result!



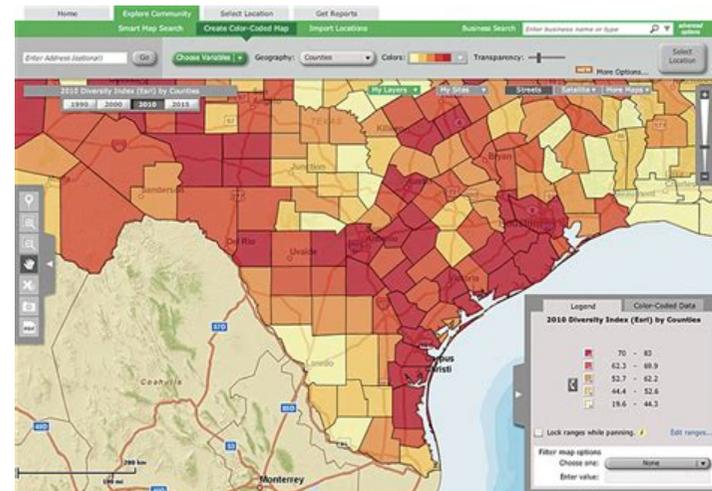
[gsp.humboldt.edu](http://gsp.humboldt.edu)

# Outputs

- Direct GIS outputs are not easily interpreted by stakeholders
- We can present them in form of maps

## Aims:

- Summarize information
- Appealing graphics
- Learn rules for presentation



Source: esri.com

---

# Practical information

---

---

# Target audience

---

- Advanced BSc subject
- Specific master programs (e.g. MGI, MUE)

## Requirements:

- We expect everyone to have some basic GIS knowledge and skills
- We expect everyone to have followed an introduction course (GRS10306 or similar)
- If not, please consider doing so (Geotools is given every year on both periods 2 AND 5)

---

# Teaching style

---

Mostly through lab sessions

- 2-3 lectures, approx. 40 minutes, per week
- The rest of time in the computer room
  - Work in groups (2 persons per group)
  - Follow a case study logic (light rail project)
- Friday: free for you to catch up or revise the material of the week
- Always check the week schedule on <http://www.geo-informatie.nl/courses/grs20806/>

---

# Rooms

---

## ■ Lectures

- Please check myportal on a weekly basis (Mon/Wed):  
[myportal.wur.nl](http://myportal.wur.nl)
- Most lectures are here in Axis-Z, but some are in Orion (April 3, C1032) or Forum (April 10, C0222)

## ■ Lab sessions

- Axis-Z PC0054
- Axis-Z PC0055

1 exception: 25 April (Thursday): in PC4050 (Orion) and PC3031 (Orion)

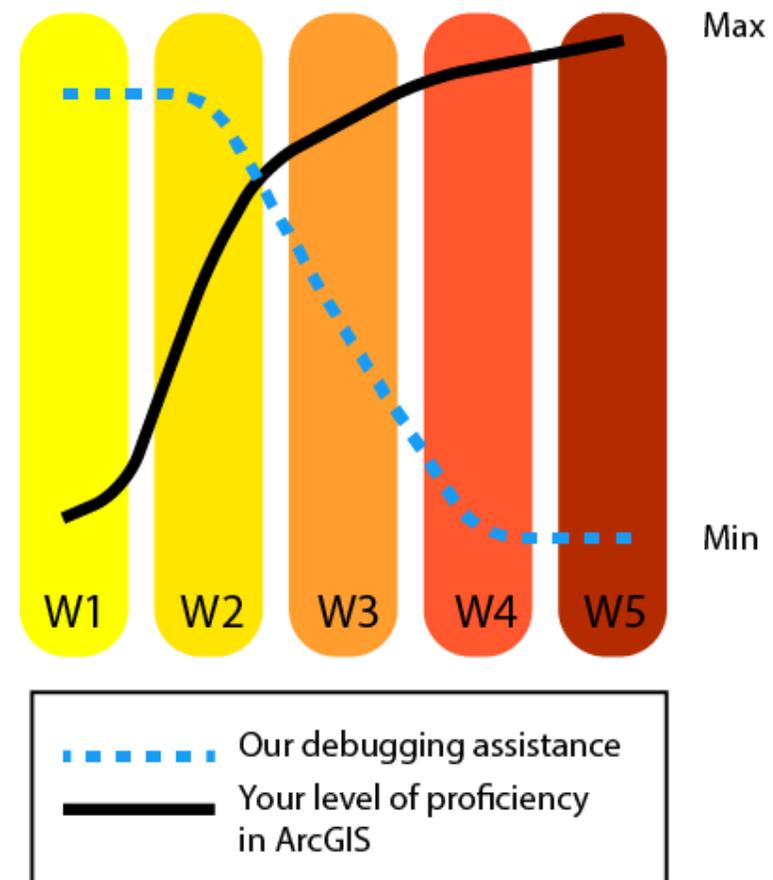
# The Easter specialties



- Easter is Sunday, April 21, so it will affect us.
- Week 5: no room access on Friday 19.
  - Complete the course ahead of time.
- Week 6: Monday April 22, University is closed
  - We will kickoff the project assignment on **Tuesday 23**
  - On Thursday, rooms are different (see prev. slide)

# Teaching style

- At the beginning we will provide a lot of input
- By the end of week 3, you are supposed to be independent:
  - Able to find the right tool
  - To learn how it works from the help
  - To parametrize it by yourself



---

# What we **do**

---

- We provide **starting concepts** in the lectures
- We provide help in the computer room when you are severely blocked
- We provide (detailed) **explanations** for understanding
- We provide the **solution of the expected model at the end of the week**

---

# What we **do not do**

---

We are 6 persons, you are 87. So:

- We do not answer questions if you haven't even tried
- We are not there to give the solution away, we're helping you to find it
- If we are busy with your colleagues, interact with your neighbours (they might have a solution for you)
- We are not a substitution to the ArcGIS help

---

# Examination

---

3 components:

- **Completion of all course material.** We won't check it, and you will have solutions every week for self assessment.
- Week 6: **project assignment** a new, unseen case will be presented to you and solved by groups.
- Week 8: **written examination** (3h)

---

# Examination (project)

---

- The project is here to evaluate
  - How you implement a new project
  - If you can find the right solution
  - If you can design a reproducible and repeatable (we will run it) pipeline
  - If you can visualize your results
- We provide, task, data and hints. We do not provide technical support (it's an exam).
- In case of software calamity we are available
- It counts for **60% of your final grade**

---

# Examination (written)

---

- The written exam is here to evaluate
  - If you understood the theory
  - If you can chose/explain the right tools
  - If facing a new situation you can sketch a realistic processing chain
  - We might provide data and ask for simple calculations
- The exam is a **digital open book**
- It counts for **40% of your final grade.**

---

# Examination (written)

---

- **It will be on Wednesday 08/05, 13h30.**
- **You will be assigned a room you have to go to**  
(there will be 2 different ones).
  - PC4050 (Orion)
  - PC4044 (Orion)

---

# How we calculate your final grade

---

- You need to have a passing mark on BOTH the project and exam (5.5 or higher)
- The two single marks are NOT rounded off
- The final mark is rounded off the closest half point

- The final grade is :

$\text{Summed\_Marks} = 0.6 * \text{Mark\_Final\_assignment} + 0.4 * \text{Mark\_Written\_Examination};$

$\text{Grade} = \text{Roundoff\_to\_nearest\_Half\_Mark}(\text{Summed\_Marks});$

# Learning outcomes

<b>GRS20806 intended learning outcomes.</b>  <b>After successful completion, students are expected to be able to:</b>	<b>Hand-in questions practical</b>	<b>Final group project assignment</b>	<b>Written open book individual exam</b>
<b>1. Use basic GIS concepts to give solutions in projects where Geo-information plays an important role</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>2. Apply concept solutions to develop a reproducible method within a project</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>3. Translate a method into a sequence of repeatable models, with a high degree of automation</b>	<b>X</b>	<b>X</b>	
<b>4. Use spatial data handling options of ArcGIS to model and resolve proposed method</b>		<b>X</b>	<b>X</b>
<b>5. Appraise the degree of importance of each dataset in relationship to the project goals</b>	<b>X</b>	<b>X</b>	
<b>6. Show results as a map, a graph and/or as a web-mapping service</b>	<b>X</b>	<b>X</b>	
<b>Contribution to final mark</b>	<b>Must be complete</b>	<b>60</b>	<b>40</b>

---

# THANK YOU

---