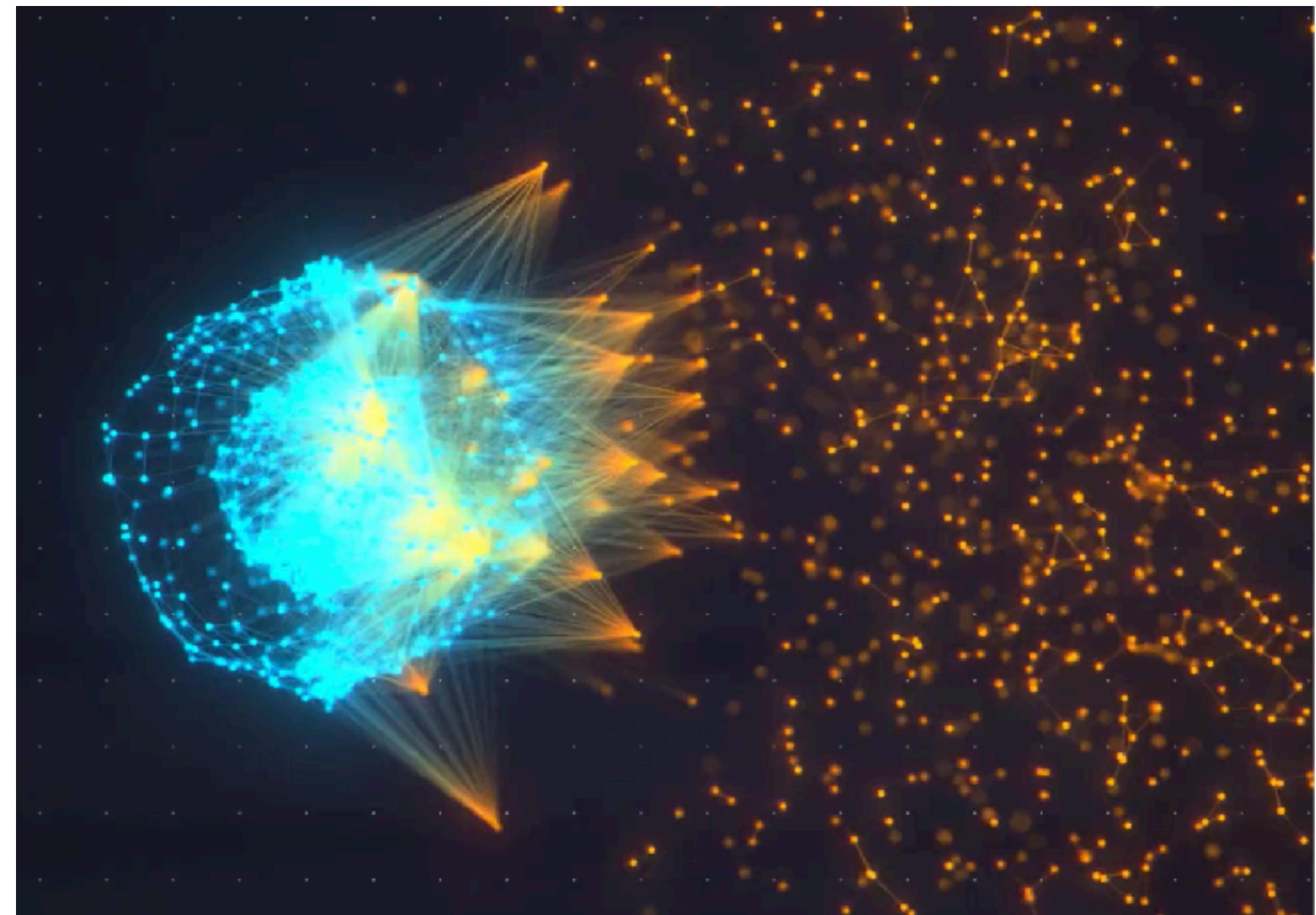


We start at 10:15

## Lecture 1: Intro to the Intro

Instructors: Michael Szell + Anastassia Vybornova

Aug 30, 2023



# Today we will prepare the ground for an intensive course!

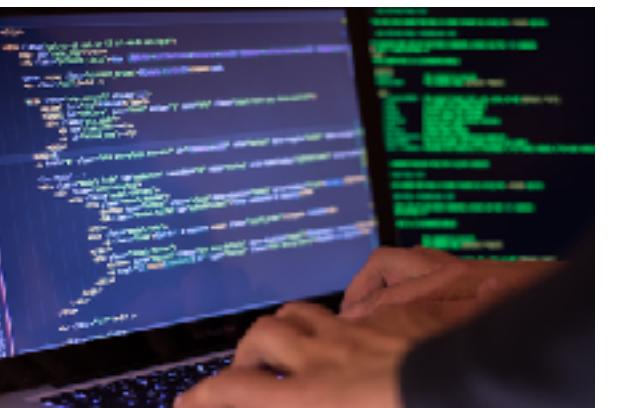
## 1. Meet the team behind this course



## 2. Course contents: Overview, schedule

Wochen	Instructor	Klassenz.	Start	Ende	Ort	Platz	TOPIC	SPARE
1	M	38	2.1.18	18.07	Aud. 29	7	Ter. Aug 2	
2	M	39	2.1.18	18.07	Seminar	12	Ter. Aug 2	
3	M	40	2.1.18	18.07	Seminar	11	Ter. Aug 2	
4	M	41	2.1.18	18.07	Seminar	13	Ter. Aug 2	
5	M	42	2.1.18	18.07	Seminar	10	Ter. Aug 2	
6	M	43	2.1.18	18.07	Seminar	11	Ter. Aug 2	
7	M	44	2.1.18	18.07	Seminar	10	Ter. Aug 2	
8	M	45	2.1.18	18.07	Seminar	13	Ter. Aug 2	
9	M	46	2.1.18	18.07	Seminar	10	Ter. Aug 2	
10	M	47	2.1.18	18.07	Seminar	10	Ter. Aug 2	
11	M	48	2.1.18	18.07	Seminar	10	Ter. Aug 2	
12	M	49	2.1.18	18.07	Seminar	10	Ter. Aug 2	
13	M	50	2.1.18	18.07	Seminar	10	Ter. Aug 2	
14	M	51	2.1.18	18.07	Seminar	10	Ter. Aug 2	
Handoutweek								
15	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
16	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
17	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
18	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
19	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
20	M	49	8.2.18	18.07	Do. 25	Ter. Aug 2		
21	M	50	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
22	M	50	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
23	M	50	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
24	M	50	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
25	M	51	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
26	M	51	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
27	M	51	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
28	M	51	15.2.18	18.07	Ter. 11.	Ter. Aug 2		
Final Exam								

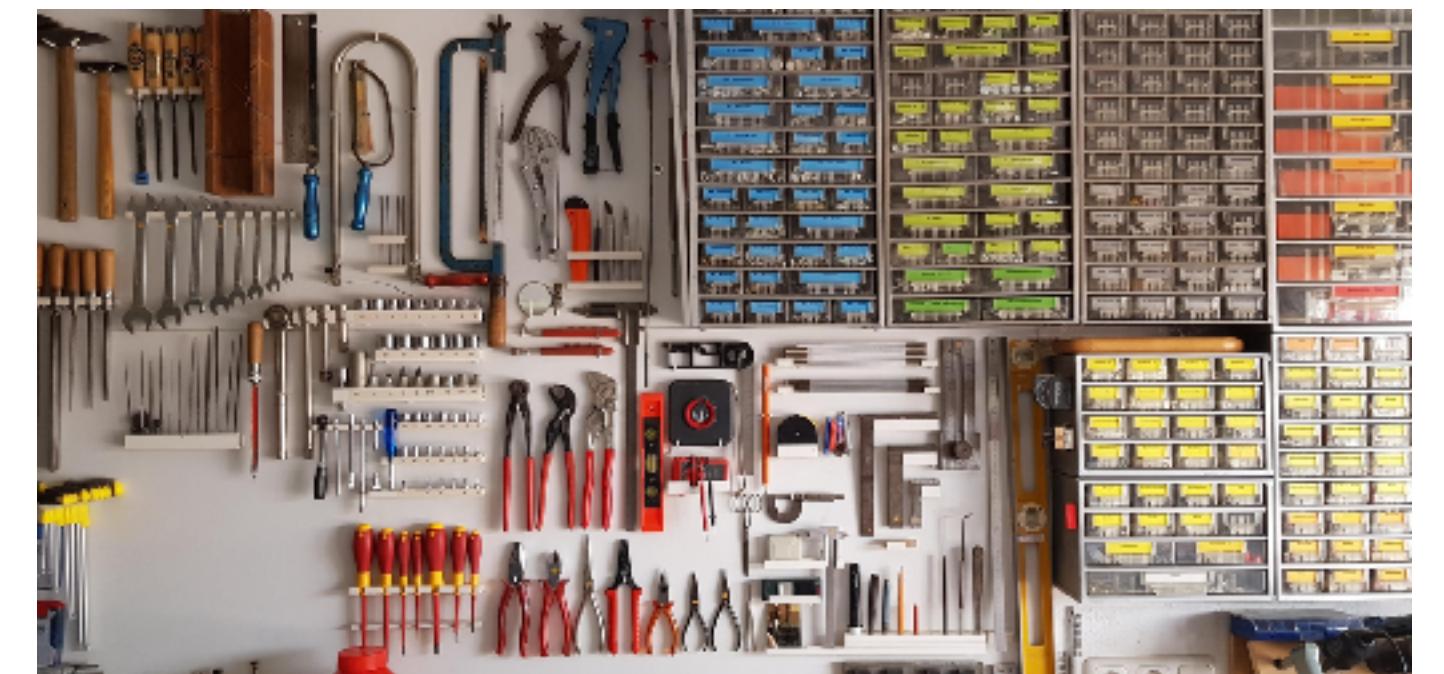
## 4. Why Programming?



## 5. Why Python?



## 3. Course organisation



## 6. How to prepare for the Python Crash Course



+ Bonus: Life Hacks to pass this course

We will not address “philosophical” topics today

~~What is Data  
Science?~~

~~Why study Data  
Science?~~

# 1. Meet the team

# Meet the team

2 teachers

+ 1+5 teaching assistants (TAs)

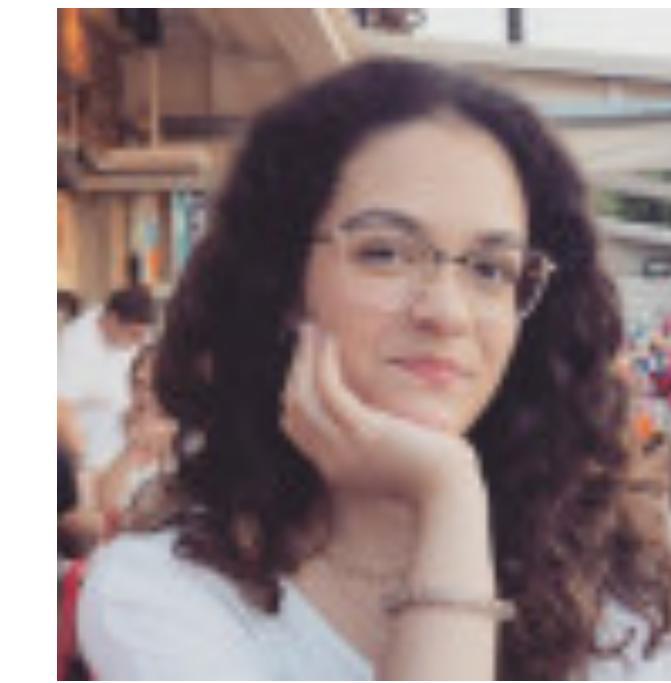
Michael



Anastassia



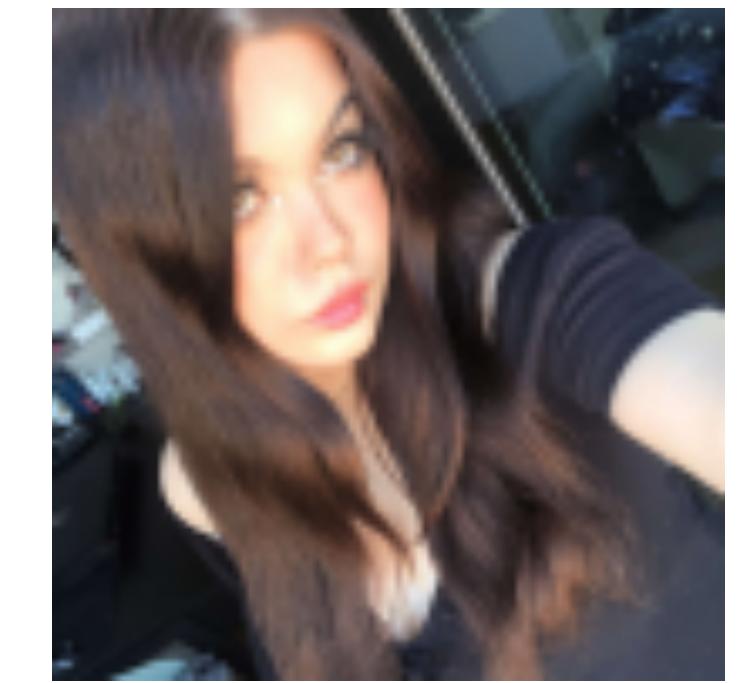
Bozhidara (StudyLab)



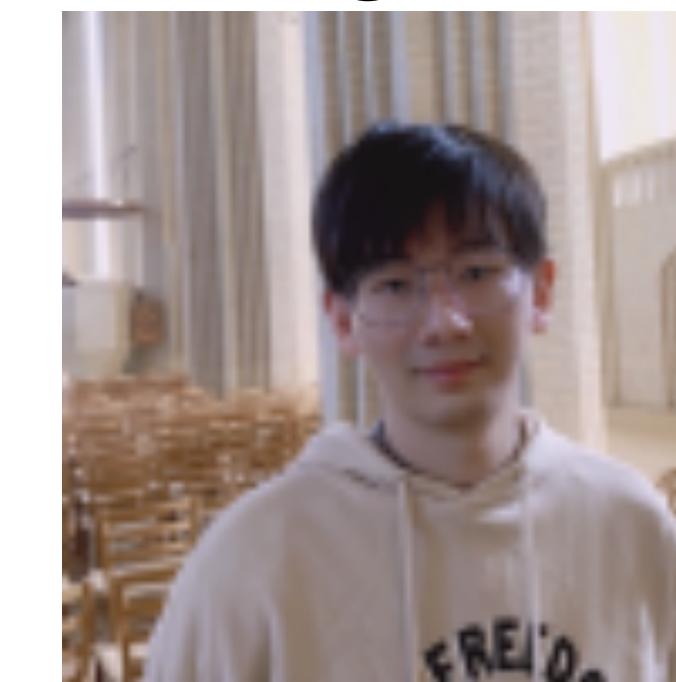
Christian



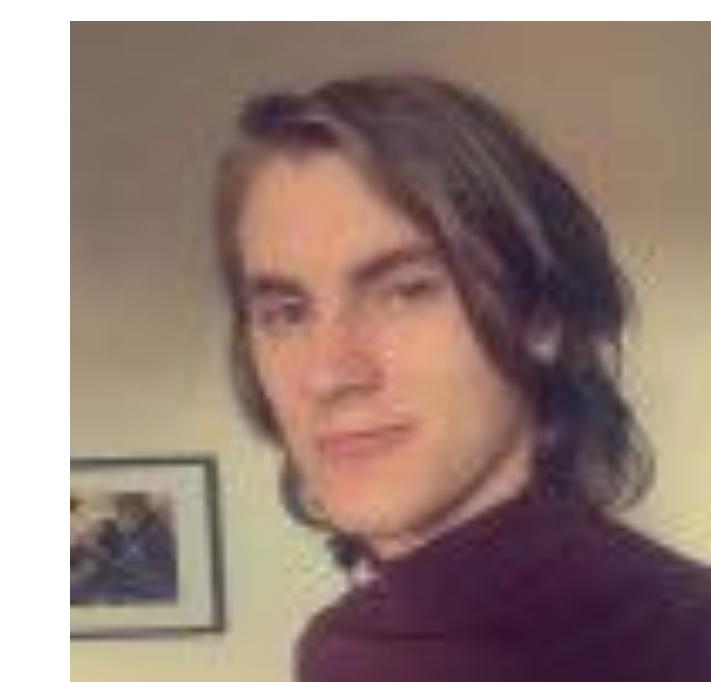
Cristina



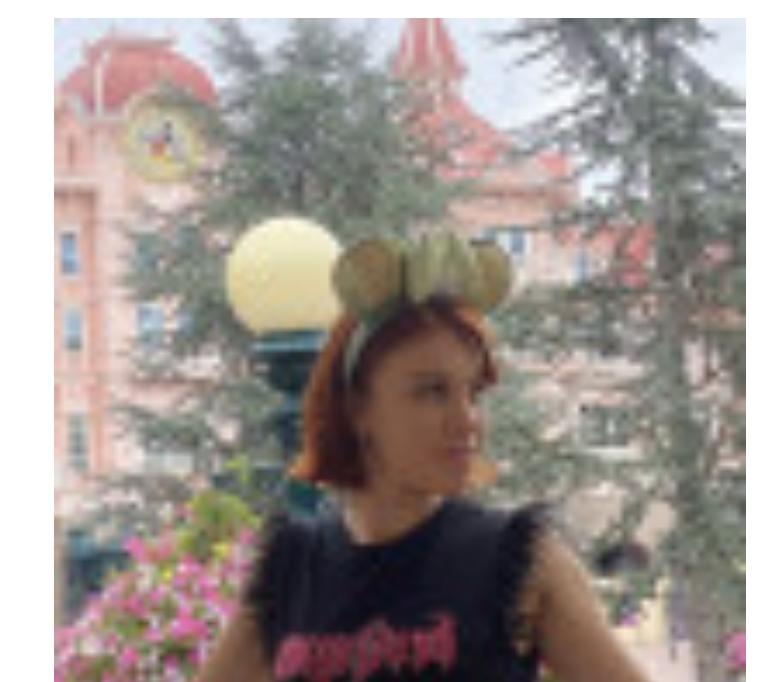
Fengmao



Simon



Yuliia



# Meet Michael



(External file, will be published on learnIT)

# Meet Anastassia



Transcultural Communication,  
Technical Physics,  
Environmental Science

**what I've studied**

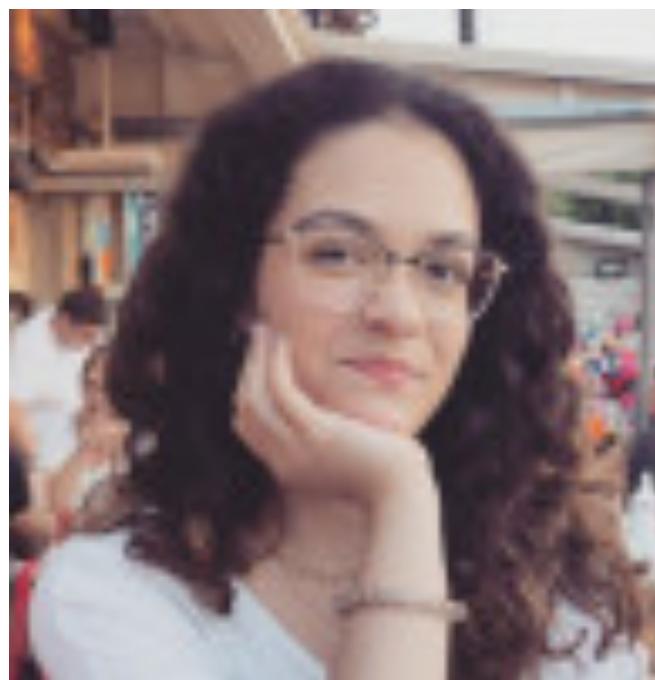
**what I'm doing now  
(PhD with Michael)**

“Urban Data Science & Network  
Science Approaches for  
Sustainable Mobility Planning”

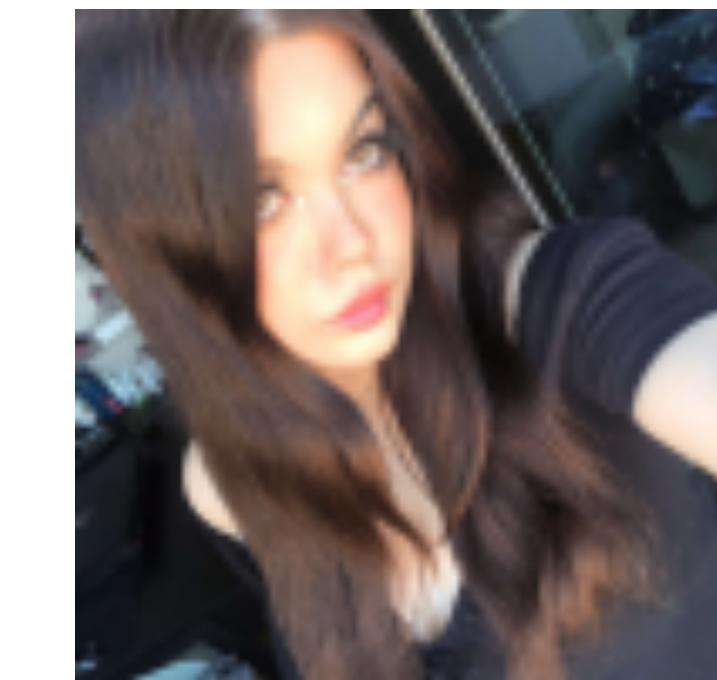
**my coding journey**    html → C++, MATLAB → R → Python → ...

# Meet the teaching assistants (TAs)

Bozhidara (StudyLab) Christian



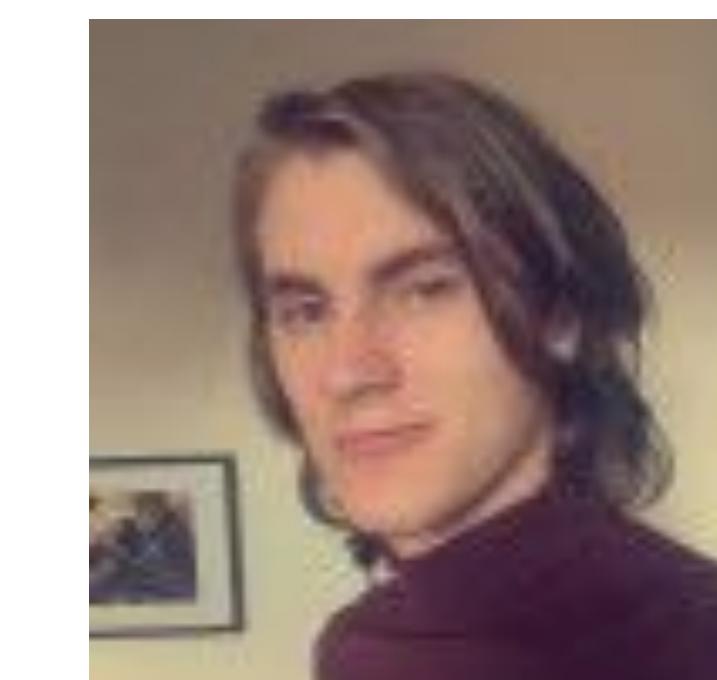
Cristina



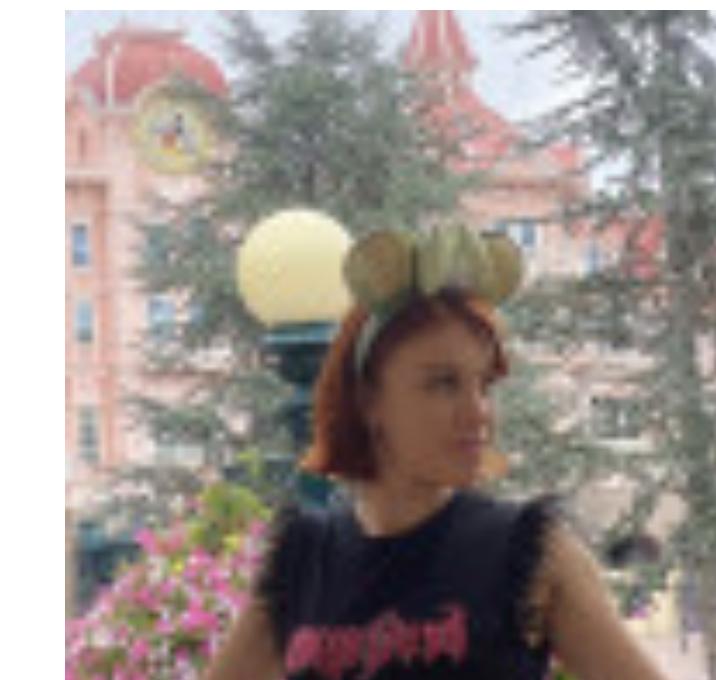
Fengmao



Simon



Yuliia



In case of issues, contact:

Michael



Office hours:  
Tuesdays 11:00-12:00  
in 3F11 (DR building)

[misz@itu.dk](mailto:misz@itu.dk)

Anastassia



[anvy@itu.dk](mailto:anvy@itu.dk)

Anonymous feedback form

Student Affairs and Programmes (SAP) located in 2A30

<https://itustudent.itu.dk/study-administration/contact-study-administration>

Tell us about yourself!

Head over to [menti](#)

## **2. Overview of course contents**

# First you will learn Python; then comes everything else

Lecture	Instructor	CalW	CourseW	Time	Date	Day	Place	Topic	Event
1	A	35	1	10:00-12:00	Aug 30	Wed	Aud 2	Course Introduction  Python Crash Course	
2	A	35	1	10:00-12:00	Sep 1	Fri	Aud 2		
3	A	36	2	10:00-12:00	Sep 6	Wed	Aud 2		
4	A	36	2	10:00-12:00	Sep 8	Fri	Aud 2		A1
5	A	37	3	10:00-12:00	Sep 13	Wed	Aud 2		
6	A	37	3	10:00-12:00	Sep 15	Fri	Aud 2		A2
7	A	38	4	10:00-12:00	Sep 20	Wed	Aud 2		
8	A	38	4	10:00-12:00	Sep 22	Fri	Aud 2		A3
9	A	39	5	10:00-12:00	Sep 27	Wed	Aud 2		
10	A	39	5	10:00-12:00	Sep 29	Fri	Aud 2		A4
11	M	40	6	10:00-12:00	Oct 4	Wed	Aud 2	Exploratory Data Analysis	
12	M	40	6	10:00-12:00	Oct 6	Fri	Aud 2		A5
13	M	41	7	10:00-12:00	Oct 11	Wed	Aud 2		
14	M	41	7	10:00-12:00	Oct 13	Fri	Aud 2		
Holiday week		42	Holiday week						
15	M	43	8	10:00-12:00	Oct 25	Wed	Aud 2	Program Design	Coding Test
16	M	43	8	10:00-12:00	Oct 27	Fri	Aud 2		A6
17	M	44	9	10:00-12:00	Nov 1	Wed	Aud 2		
18	M	44	9	10:00-12:00	Nov 3	Fri	Aud 2		A7
19	M	45	10	10:00-12:00	Nov 8	Wed	Aud 2	Networks & Skewed Data	
20	M	45	10	10:00-12:00	Nov 10	Fri	Aud 2		A8
21	M	46	11	10:00-12:00	Nov 15	Wed	Aud 2		Coding Re-Test
22	M	46	11	10:00-12:00	Nov 17	Fri	Aud 2		A9
23	M	47	12	10:00-12:00	Nov 22	Wed	Aud 2	Data Science in Practice	
24	M	47	12	10:00-12:00	Nov 24	Fri	Aud 2		
25	M	48	13	10:00-12:00	Nov 29	Wed	Aud 2		
26	M	48	13	10:00-12:00	Dec 1	Fri	Aud 2		
27	M	49	14	No lecture	Dec 6	Wed	-	Mock Exam	Mock Exam
28	M	49	14	10:00-12:00	Dec 8	Fri	Aud 2		
			1	09:00-13:00	Jan 3	Wed	TBD	Final Exam	Final Exam

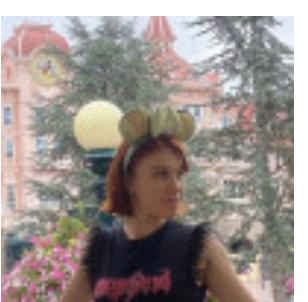
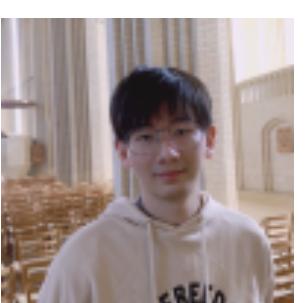
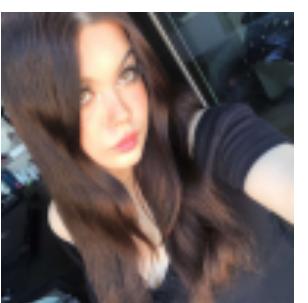
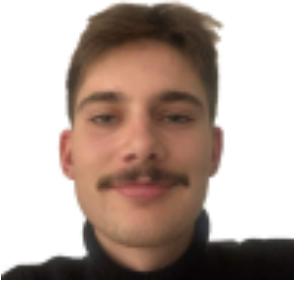
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7	A	38	4	10:00-12:00	Sep 20	Wed	Aud 2		
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10	A	39	5	10:00-12:00	Sep 29	Fri	Aud 2		
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19	M	45	10	10:00-12:00	Nov 8	Wed	Aud 2		Coding Re-Test
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25	M	48	13	10:00-12:00	Nov 29	Wed	Aud 2		
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28	M	49	14	10:00-12:00	Dec 8	Fri	Aud 2		Final Exam
		1	09:00-13:00		Jan 3	Wed	TBD	Final Exam	



### **3. Course organisation**

# Our interface to this course is LearnIT

X ITU LEARNIT

Introduction to Data Science and Programming (Autumn 2023)

My Courses / Introduction to Data Science and Programming (Autumn 2023)

## Introduction to Data Science and Programming (Autumn 2023)

Welcome to IDSP! Until we see each other on Aug 30 10:00 in Aud 2, check out the self-study resources.

### Introduction to Data Science and Programming: Michael Szell

WELCOME TO IDSP

Data Scientist researching:

Human mobility

Urban infrastructure networks

Python

Mandatory activities

Assignments: Starting in Sep, distributed on Fridays 14:00, due on Mondays 10 days later.  
For each assignment: a 2nd attempt is granted. We allow for a maximum of 1 assignment to be failed/not submitted.

COURSE MANAGER  
Michael Szell

TEACHER  
Anastassia Vybornova

TEACHING ASSISTANT  
Cristina Avram  
Simon Martin Breum  
Yuliia Sclomko  
Fengmao Wang  
Christian Weidemann

UPCOMING EVENTS  
Lecture in OA35 (Aud 2)  
Wed, 30 Aug, 10:00 » 12:00  
Exercises in 2A20, 3A18, 2A18  
Wed, 30 Aug, 12:00 » 14:00  
Live Coding in OA35 (Aud 2)  
Wed, 30 Aug, 14:00 » 16:00  
Lecture in OA35 (Aud 2)  
Fri, 1 Sep, 10:00 » 12:00

Anastassia Vybornova

Turn editing on



Set your profile picture here!



<https://learnit.itu.dk/user/edit.php>

<https://learnit.itu.dk/course/view.php?id=3022199>

# Our interface to this course is LearnIT

Here we will distribute  
all learning material

Lecture 1, Aug 30

Course introduction



Exercise01 - bootIT

installation instructions



Exercise01 - testIT

to verify that installation worked correctly, run this notebook (right-click to download)



Exercise01 - checkIT

please fill out **before** Lecture02!

Lecture material: 10am the same day  
Exercise material: 12am the same day

# Our weekly schedule - overview

	Monday	Tuesday	Wednesday	Thursday	Friday
8					
9					
10			Lecture Aud 2		Lecture Aud 2
11					
12			Exercises 2A18+20 (A), 3A18 (B)		Exercises 2A54 (A), 3A54 (B)
13					
14	StudyLab 2F14		Live coding Aud 2		StudyLab 3A50
15					
16					
17					

[StudyLab](#) course page

<https://cloud.timeedit.net/itu/web/priq9x55Y0X8YZQZ758003yQ6053>

# Our weekly schedule - Lecture

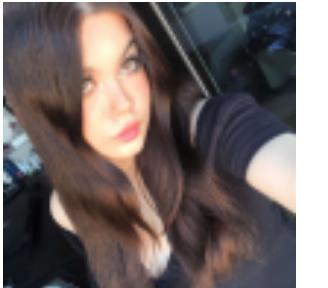
	Monday	Tuesday	Wednesday	Thursday	Friday
8					
9					
10			Lecture Aud 2		Lecture Aud 2
11					
12					
13					
14					
15					
16					
17					



<https://cloud.timeedit.net/itu/web/priq9x55Y0X8YZQZ758003yQ6053>

# Our weekly schedule - Exercises (groups: A and B)

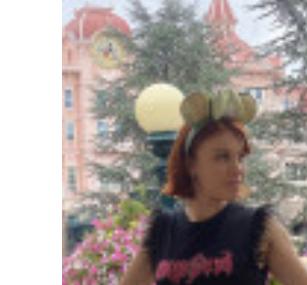
	Monday	Tuesday	Wednesday	Thursday	Friday
8					
9					
10					
11					
12					
13			<div style="background-color: #f0e68c; padding: 10px; text-align: center;"><b>Exercises</b> 2A18+20 (A), 3A18 (B)</div>		<div style="background-color: #f0e68c; padding: 10px; text-align: center;"><b>Exercises</b> 2A54 (A), 3A54 (B)</div>
14					
15					
16					
17					



**Group A or B?**  
**Find out on learnIT!**

# Our weekly schedule - Live coding

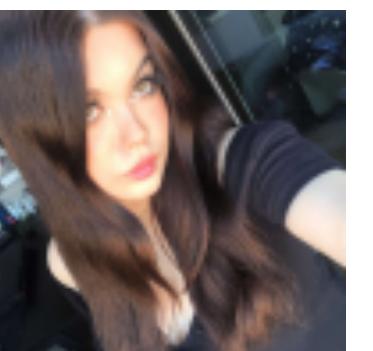
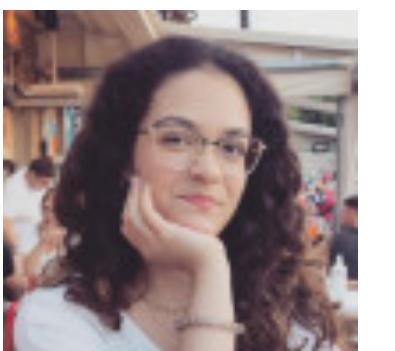
	Monday	Tuesday	Wednesday	Thursday	Friday
8					
9					
10					
11					
12					
13					
14			Live coding Aud 2		
15					
16					
17					



<https://cloud.timeedit.net/itu/web/priq9x55Y0X8YZQZ758003yQ6053>

# Our weekly schedule - StudyLab

	Monday	Tuesday	Wednesday	Thursday	Friday	
8						
9						
10						
11						
12						
13						
14	StudyLab 2F14				StudyLab 3A50 (StudyLab)	
15						
16	in the DR building					
17						



<https://cloud.timeedit.net/itu/web/priq9x55Y0X8YZQZ758003yQ6053>

We will take plenty of breaks during class

**Lecture**

**10:15-12:00**

with a 10min break

**12:00-12:30 lunch break**

**Exercises**

**12:30-14:00**

with a 10min break

# We will take plenty of breaks during class

## Lecture

**10:15-12:00**

with a 10min break

**12:00-12:30 lunch break**

## Exercises

**12:30-14:00**

with a 10min break



We are MANY people.

Please be on time!

We will have some **mandatory** activities

Lecture	Instructor	CalW	CourseW	Time	Date	Day	Place	Topic	Event	
1	A	35	1	10:00-12:00	Aug 30	Wed	Aud 2	Course Introduction	A1	
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6	A	37	3	10:00-12:00	Sep 15	Fri	Aud 2			
7	A	38	4	10:00-12:00	Sep 20	Wed	Aud 2			
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19	M	45	10	10:00-12:00	Nov 8	Wed	Aud 2	Networks & Skewed Data	A6	
20	M	45	10	10:00-12:00	Nov 10	Fri	Aud 2			
21	M	46	11	10:00-12:00	Nov 15	Wed	Aud 2			
22	M	46	11	10:00-12:00	Nov 17	Fri	Aud 2			
23	M	47	12	10:00-12:00	Nov 22	Wed	Aud 2	Data Science in Practice	A7	
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28	M	49	14	10:00-12:00	Dec 8	Fri	Aud 2			
1		09:00-13:00			Jan 3	Wed	TBD	Final Exam		
								Final Exam		



## Mandatory activities

**Assignments:** Starting in Sep, distributed on Fridays 14:00, due on Monday 11:59pm. For each assignment a 2nd attempt is granted. We allow for a maximum of 2 attempts per assignment.

	Distributed	Due Date
 Assignment 1	Sep 8	Sep 18, 23:59
 Assignment 2	Sep 15	Sep 25, 23:59
 Assignment 3	Sep 22	Oct 2, 23:59
 Assignment 4	Sep 29	Oct 9, 23:59
 Assignment 5	Oct 6	Oct 23, 23:59
 Assignment 6	Oct 27	Nov 6, 23:59
 Assignment 7	Nov 3	Nov 13, 23:59
 Assignment 8	Nov 10	Nov 20, 23:59
 Assignment 9	Nov 17	Nov 25, 23:59
 Coding Test: Wed, Oct 25th, 14:10-16:00		
 Coding Re-Test: Wed, Nov 15th, 14:10-16:00		

# We will have some **mandatory** activities

**9 Assignments**    Distributed on Fridays 14:00 (first one on Sep 8, 2023)  
                            Due 10 days later, Monday 23:59 (first one on Sep 18, 2023)  
  
                            For each assignment a 2nd attempt is granted.  
                            We allow for a maximum of 1 assignment  
                            to be failed/not submitted.  
  
**One assignment can be failed/missed 2 times (you get ONE 3rd chance)**

**1 Coding Test**    Oct 25, 2023  
                            2nd chance Nov 15, 2023  
**There is no 3rd chance**

# We will have some **mandatory** activities

<b>9 Assignments</b>	Distributed on Fridays 14:00 (first one on Sep 8, 2023)  Due 10 days later, Monday 23:59 (first one on Sep 18, 2023)  For each assignment a 2nd attempt is granted. We allow for a maximum of 1 assignment to be failed/not submitted.  <b>One assignment can be failed/missed 2 times (you get ONE 3rd chance)</b>
<b>1 Coding Test</b>	Oct 25, 2023  2nd chance Nov 15, 2023  <b>There is no 3rd chance</b>
<b>1 Final Written Exam</b>	<b>You need to pass both the assignments &amp; the coding test before the written exam!</b>

# We will have some **mandatory** activities

<b>9 Assignments</b>	Distributed on Fridays 14:00 (first one on Sep 8, 2023)  Due 10 days later, Monday 23:59 (first one on Sep 18, 2023)  For each assignment a 2nd attempt is granted. We allow for a maximum of 1 assignment to be failed/not submitted.  <b>One assignment can be failed/missed 2 times (you get ONE 3rd chance)</b>
<b>1 Coding Test</b>	Oct 25, 2023  2nd chance Nov 15, 2023  <b>There is no 3rd chance</b>
<b>1 Final Written Exam</b>	Jan 3, 2023  If you fail/miss, you have a 2nd chance later

Can ChatGPT help me pass this class?



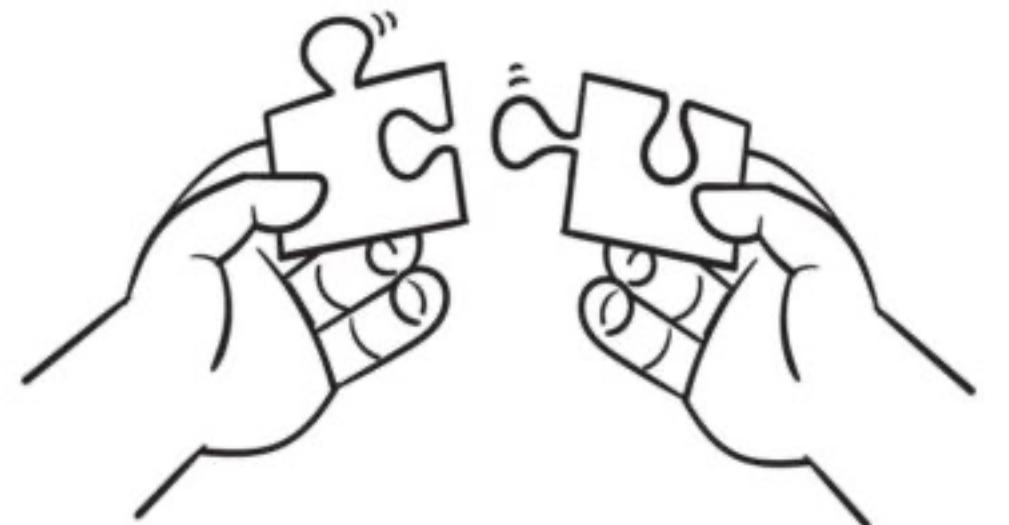
Can ChatGPT help me pass this class?

No.

# Using ChatGPT can damage your programming skills:

In this course, for solving exercises, assignments, or coding test, please do not use large language models (LLMs) like ChatGPT, because:

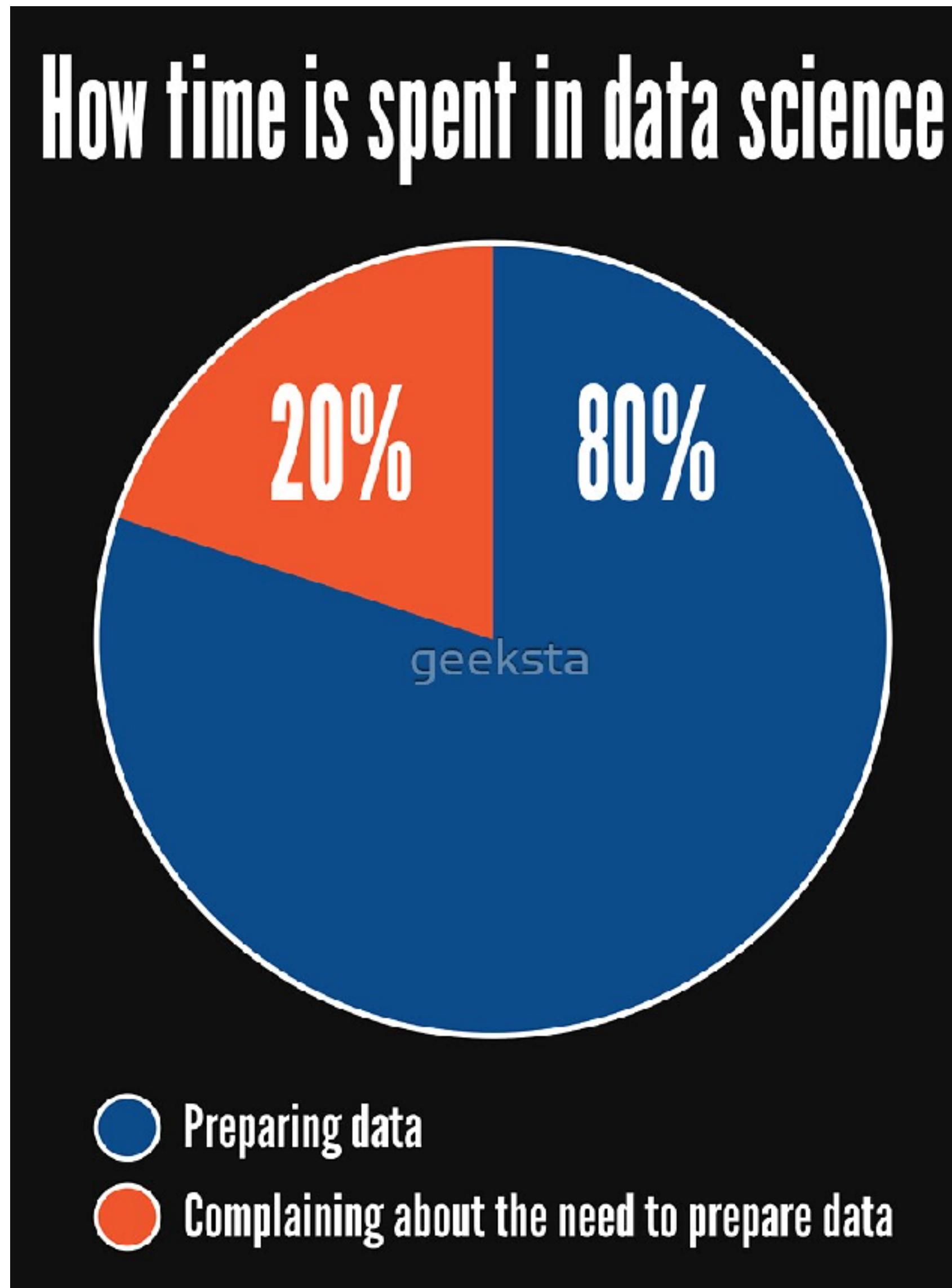
- 1) the goal of this course is to learn programming manually, which you will absolutely need in your future studies at ITU and in your career,
- 2) all parts of the course are designed to be solved **manually**,
- 3) the final exam will be a pen & paper exam, so ChatGPT won't help there anyway,
- 4) large-language models (LLMs) are unreliable



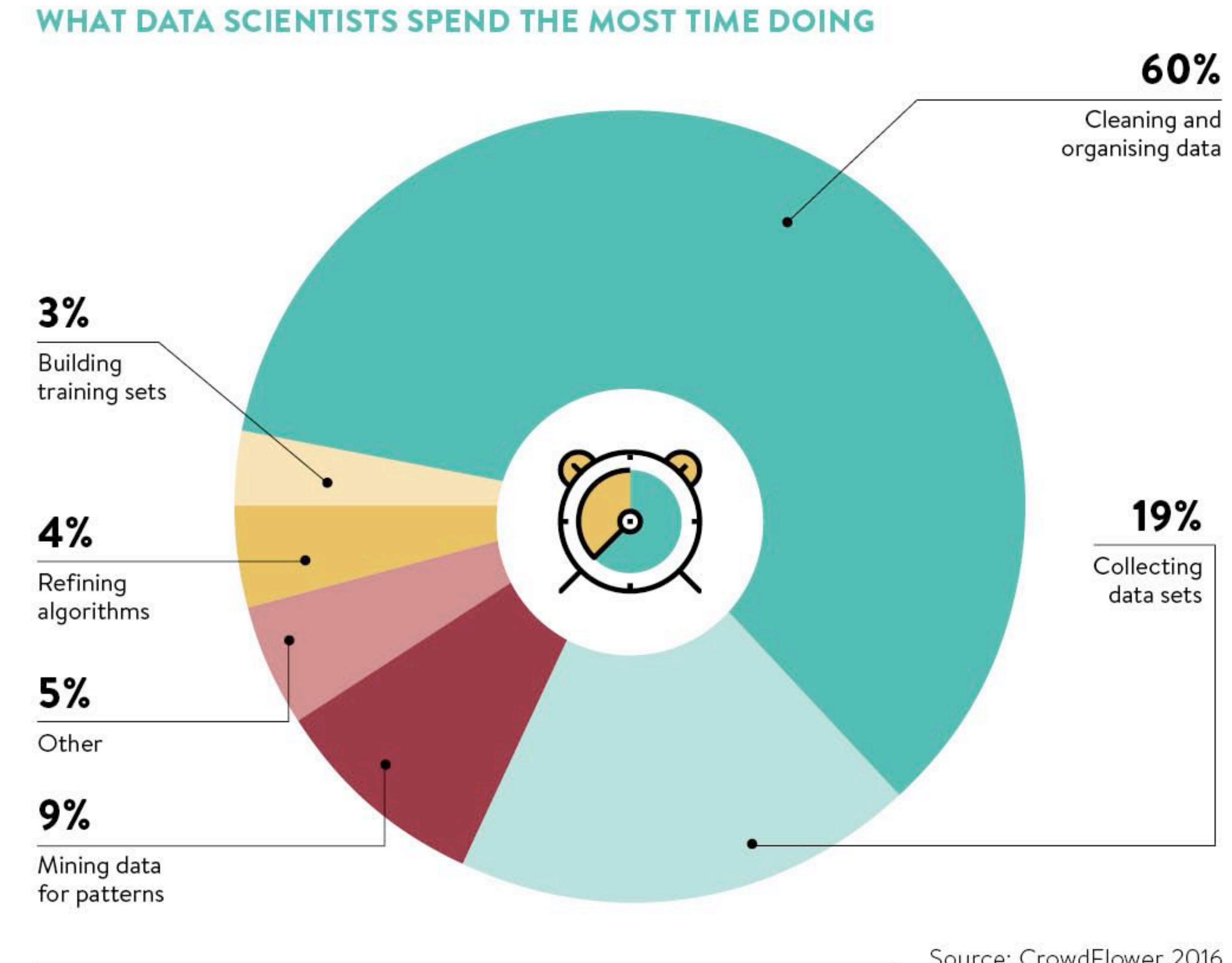
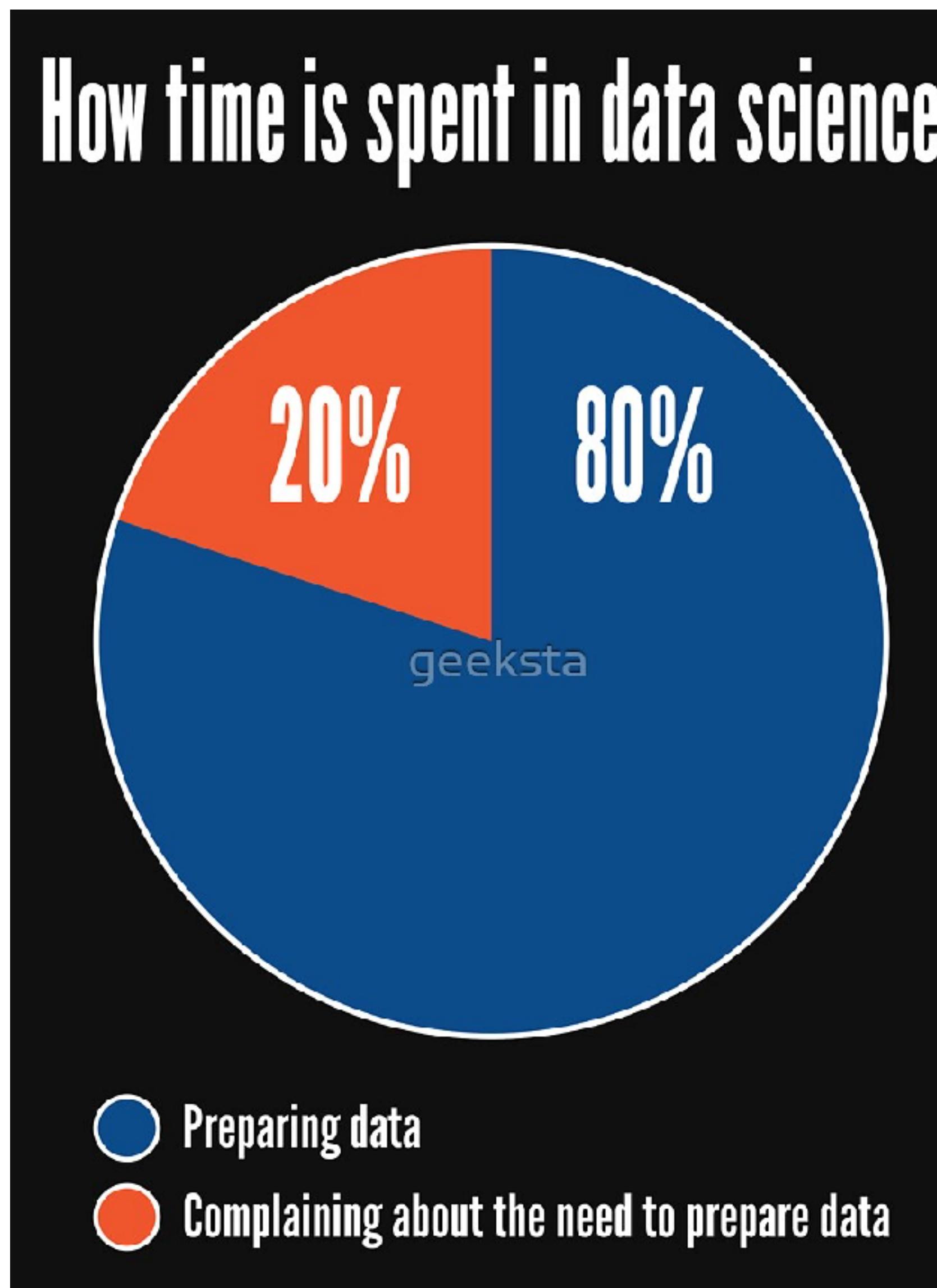
**BREAK UNTIL 11:10**

# 4. Why Programming?

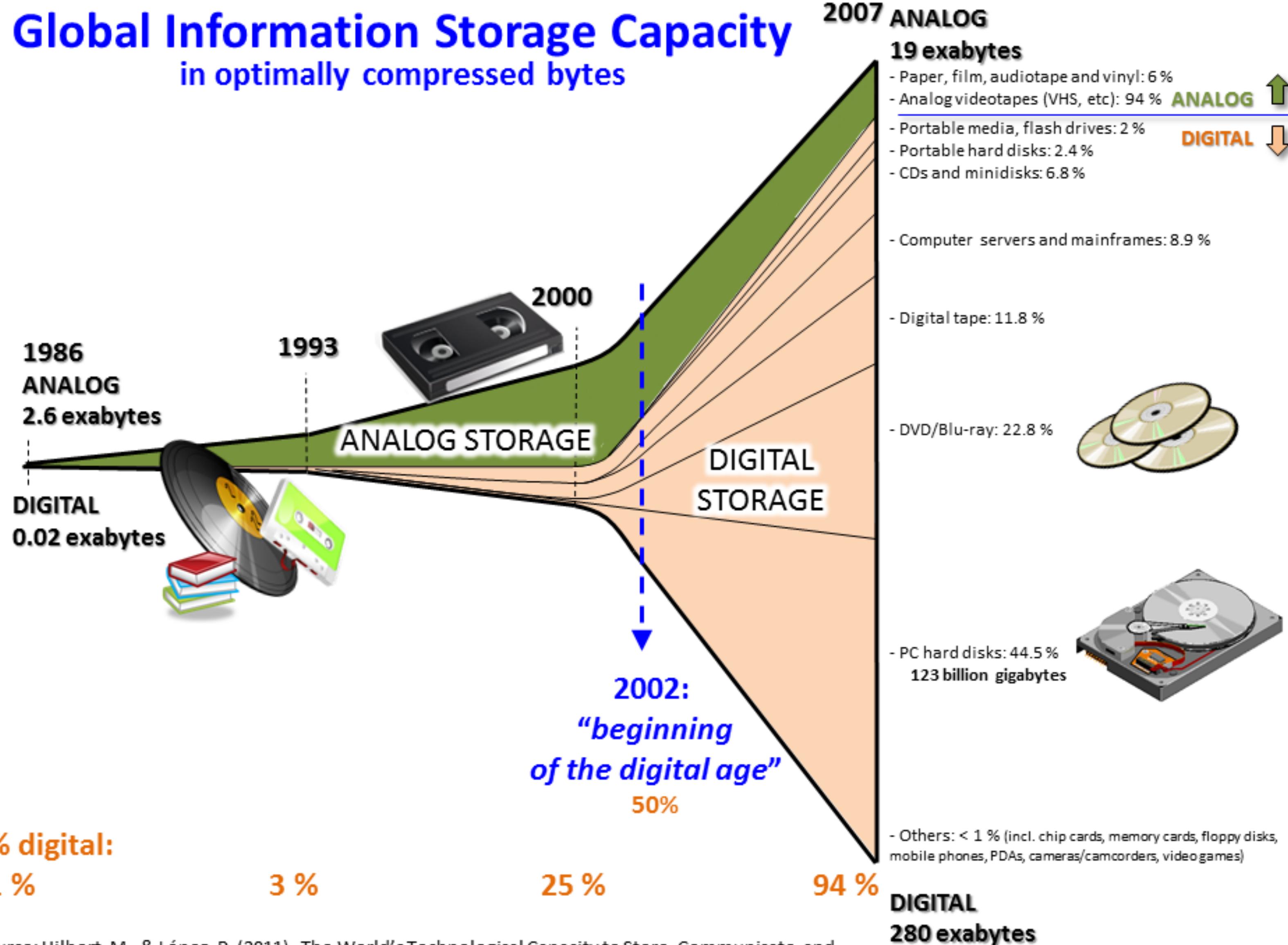
# Data Scientists spend 80% of their time preparing data



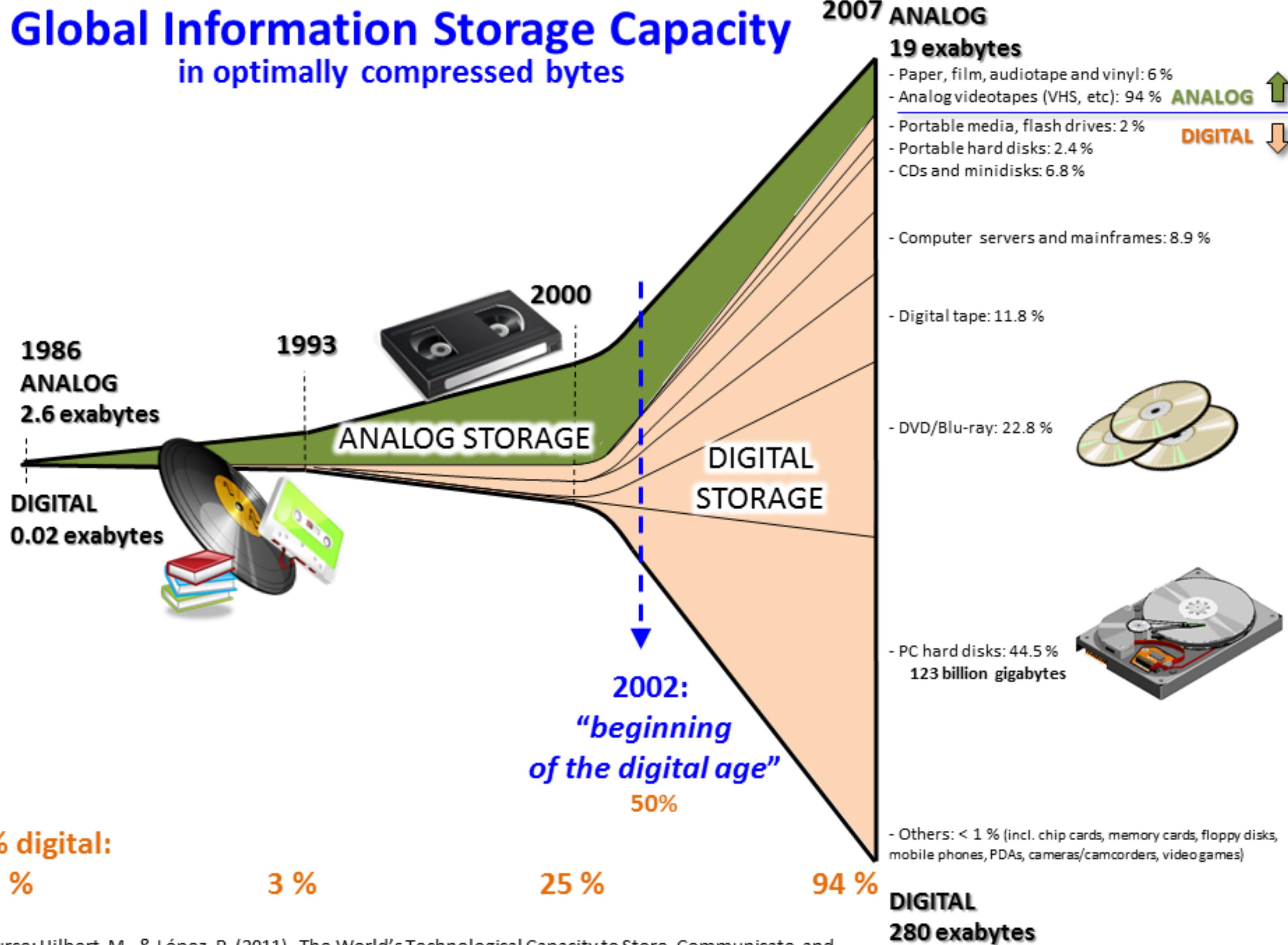
# Data Scientists spend 80% of their time preparing data



# The history of Data Science in 1 slide



# The history of Data Science in 1 slide



Source: Hilbert, M., & López, P. (2011). The World's Technological Capacity to Store, Communicate, and Compute Information. *Science*, 332(6025), 60–65. <http://www.martinhilbert.net/WorldInfoCapacity.html>

It is ever more relevant  
to handle "Big Data"

But making sense of data  
with statistics + computer  
science has a long history:

<https://www.forbes.com/sites/gilpress/2013/05/28/a-very-short-history-of-data-science/#3923090055cf>

<https://www.kdnuggets.com/2016/06/rayli-history-data-mining.html>

<https://www.forbes.com/sites/gilpress/2013/05/09/a-very-short-history-of-big-data/#c667d0d65a18>

# Data Scientists need 4 skills

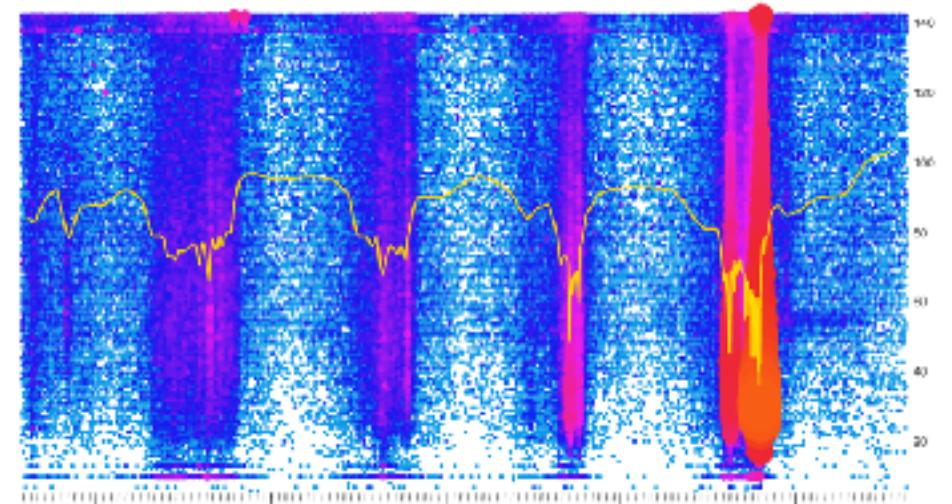
**1) Programming & Computer Science**  
to handle large data sets efficiently



**2) Mathematics & Statistics**  
to correctly ask questions and analyze data

$$P(A | B) = \frac{P(B | A)P(A)}{P(B)}$$

**3) Communication & Visualization**  
to exchange insights, especially with  
somebody less conversant in data



**4) Domain knowledge**  
to ask the right questions



# 5. Why Python?

# Starting your programming journey with Python because:

easy



# Starting your programming journey with Python because:

~~easy~~



# Starting your programming journey with Python because:

~~easy~~ you can start coding right away



# Starting your programming journey with Python because:

~~easy~~ you can start coding right away

if you've never coded before,  
many recommend to start with Python



# Starting your programming journey with Python because:

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if you've never coded before,  
many recommend to start with Python

once you have a “coding mindset”, it’s much  
easier to learn a new programming language



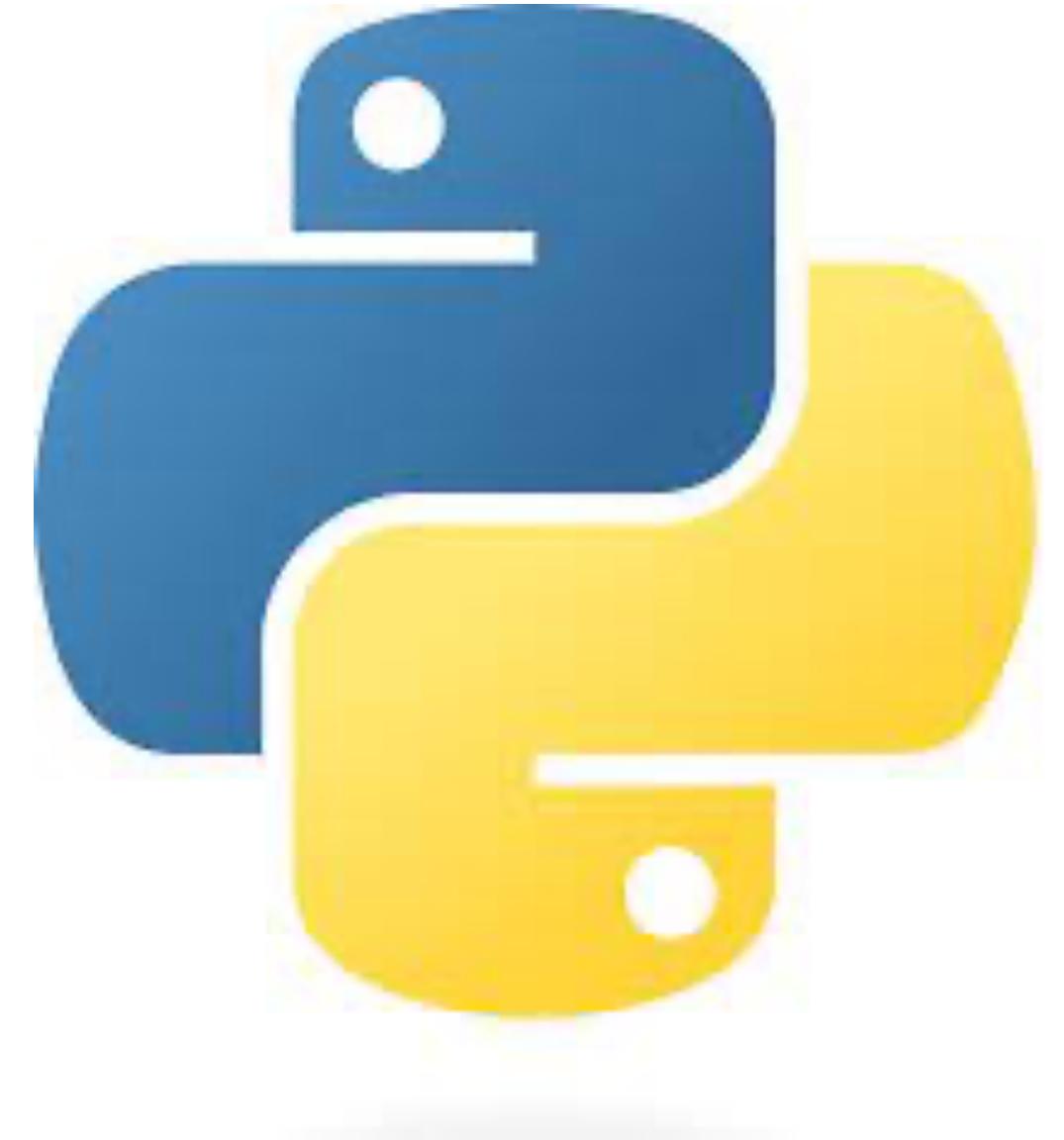
# Starting your programming journey with Python because:

~~easy~~ you can start coding right away

if you've never coded before,  
many recommend to start with Python

once you have a “coding mindset”, it’s much  
easier to learn a new programming language

**widely used, particularly for Data Science**



# 6. How to prepare for the Python Crash Course

Be prepared to start coding at the next lecture!

!!! Go to the **exercises** today (Exercise01: “bootIT”)

1. Check out the installation instructions ([bootIT](#))
2. Verify that it worked by running a notebook ([testIT](#))
- 3. Fill out the checklist on learnIT ([checkIT](#))**

!!! Next lecture, we will already be using jupyter notebook - **be prepared!**

Be prepared to start coding at the next lecture!

!!! Go to the **exercises** today (Exercise01: “bootIT”)

1. Check out the installation instructions ([bootIT](#))
2. Verify that it worked by running a notebook ([testIT](#))
- 3. Fill out the checklist on learnIT ([checkIT](#))**

!!! Next lecture, we will already be using jupyter notebook - **be prepared!**

(If you’re not - you can still get help in the [Study Labs](#) (first one is on Sep 1st))

# Support is available!

Go to the **exercises today** (Exercise01: “bootIT”)  
today: additional session to **14:00-16:00 in Aud2!**

Go to the **Study Lab on Sep 1st**

Ask away in the Q&A forum in learnIT

 **Feedback / Contact**

Anonymous feedback form: <https://forms.gle/bt33gLQBqRV7ZafV7>  
Michael's office hours : Tuesdays 11:00-12:00, 3F11 (DR P4 building)

 News

 **Q&A Forum**

 Self-study resources

We want to make sure that everyone is on board

## Checklist to fill out BEFORE Lecture 02!

All items:



100%

- I have Anaconda installed (Ex01, step1)*
- I know how to open up the jupyter notebook app (Ex01, step2)*
- I know how to open up a CLI on my machine (Ex01, step2)*
- I know how to create an empty jupyter notebook (Ex01, step3)*
- I was able to run the exercise01\_testIT.ipynb notebook (Ex01, step4)*

**BONUS: Life hacks  
for this course**

What else?