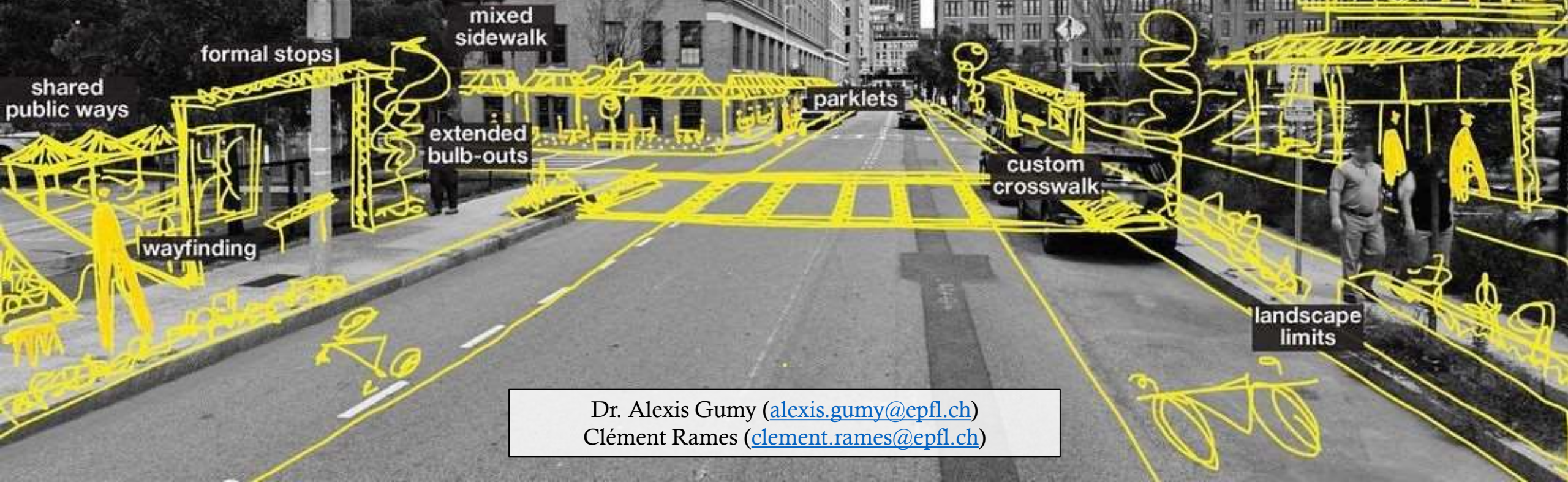


Computational Methods in Urban Studies

Week 1 : What is CMUS ?



Dr. Alexis Gummy (alexis.gummy@epfl.ch)
Clément Rames (clement.rames@epfl.ch)

Introduction

Ice breaker & introduction

→ Background of the audience and why computational methods in Urban Studies.

1. Critical Urban Studies

→ Integrate the social sciences into the analysis of the built environment.

2. Towards social engineering

→ What is interdisciplinarity and how to make it work.

3. Reflexive quantification

→ Numbers are political and need to be produced and handled as such.

4. Additional info

→ Classes, demos, semester group exercise, ateliers, and presentations.

Introduction

- **Quick round of presentation / ice breaker**
 - Name, personal background (bachelor), previous university...
 - Optional : what do you expect from the new master and from CMUS ?
 - CMUS as a place for scientifically sound and enlightening debates.

Introduction

- **Why this class?**

→ On the role of research and academia to guide public policies...

réf.: White House ↓



Introduction

- Why this class?

réf.: tumblr ↓

accessible	discriminated	inclusive	privilege
activism	discrimination	inclusive leadership	privileges
activists	discriminatory	inclusiveness	promote diversity
advocacy	disparity	inclusivity	promoting diversity
advocate	diverse	increase diversity	pronoun
advocates	diverse backgrounds	increase the diversity	pronouns
affirming care	diverse communities	indigenous community	prostitute
all-inclusive	diverse community	inequalities	race
allyship	diverse group	inequality	race and ethnicity
anti-racism	diverse groups	inequitable	racial
antiracist	diversified	inequities	racial diversity
assigned at birth	diversify	inequity	racial identity
assigned female at birth	diversifying	injustice	racial inequality
assigned male at birth	diversity	institutional	racial justice
at risk	enhance the diversity	intersectional	racially
barrier	enhancing diversity	intersectionality	racism
barriers	environmental quality	key groups	segregation
belong	equal opportunity	key people	sense of belonging
blas	equality	key populations	sex
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biases towards	ethnicity	marginalize	sociocultural
biologically female	excluded	marginalized	socioeconomic
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BIPOC	expression	mental health	stereotype
Black	female	minorities	stereotypes
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breastfeed + person	feminism	most risk	systemically
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chestfeed + person	GBV	multicultural	trans
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climate science	gender based violence	non-binary	trauma
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community diversity	gender identity	oppression	tribal
community equity	gender ideology	oppressive	unconscious bias
confirmation bias	gender-affirming care	orientation	underappreciated
cultural competence	genders	people + uterus	underprivileged
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cultural heritage	hate speech	person-centered	underrepresented
cultural sensitivity	health disparity	person-centered care	underserved
culturally appropriate	health equity	polarization	undervalued
culturally responsive	hispanic minority	political	victim
DEI	historically	pollution	victims
DEIA	identity	pregnant people	vulnerable populations
DEIAB	immigrants	pregnant person	women
DEIJ	implicit bias	pregnant persons	women and
disabilities	implicit biases	prejudice	underrepresented
disability	inclusion		

Introduction

réf.: tumblr ↓

• Why this class?

→ It's about **social inequalities**.

→ *Social justice* : activism, democracy, etc.

→ *Minorities* : LGBTQIA+, racism, etc.

→ *Inequalities* : discrimination, exclusion,

diversity, etc.

→ Socioeconomic status... and soon sociology?

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réf.: [tumblr](#) ↓

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diversity, etc.

→ Socioeconomic status... and soon sociology?

→ ...and about **sustainable planning**.

→ *Environment* : clean energy, climate, pollution, etc.

→ *Externalities* : health disparity, immigrants, etc.

→ It's about **urban studies**.

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Introduction

- **What is CMUS all about?**

- At the end of the class, we do not expect you to be (urban) sociologists, transport experts or data scientists, but...
- *Critical*. Know how to identify, describe, assess, and reduce social inequalities in urban planning ~ a matter of *perspective*.
- *Versatile*. Understand the value of interdisciplinarity for tailoring (socially and environmentally) sustainable policies ~ a matter of *negotiation*.
- *Reflexive*. Be aware of the biases and limits stemming from the choice and use of quantitative tools to “measure” socio-spatial processes ~ a matter of (scientific) *rigor*.
- *Equipped*. Select relevant methods depending on the research question and/or observed planning issues ~ a matter of *experience*.

1 : Critical urban studies

- **The built environment from a different perspective**
→ *Object* (of research or practice) : places and their components

réf.: brandfinance.com ↓



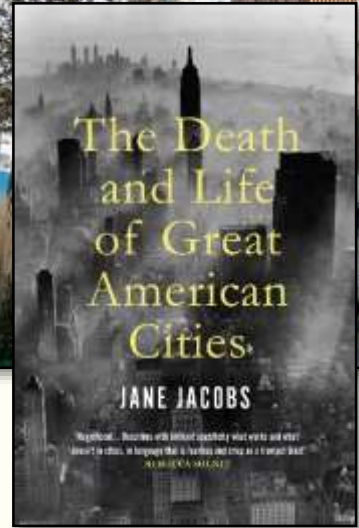
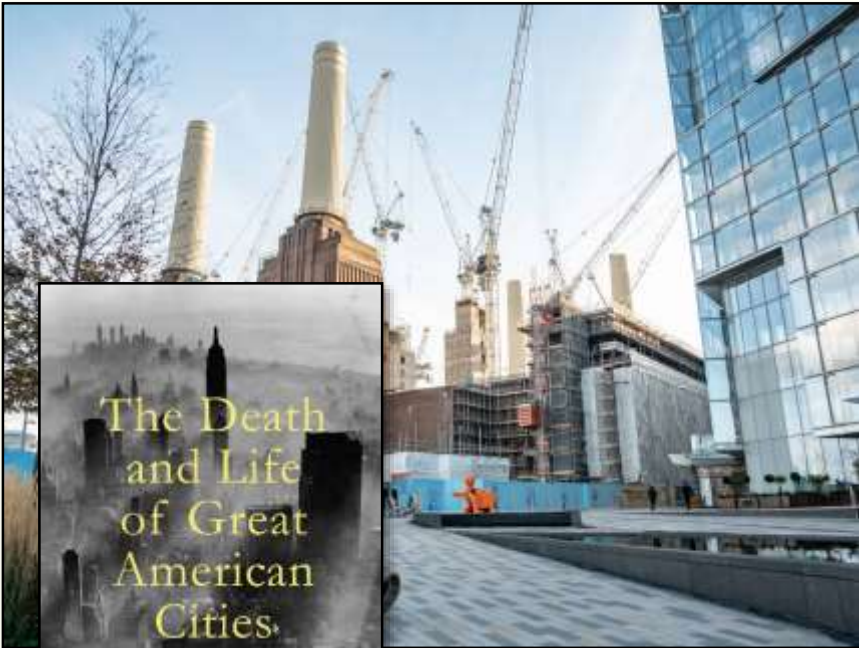
↑ réf.: [Base Architecture](#)

réf.: imd.org →



1 : Critical urban studies

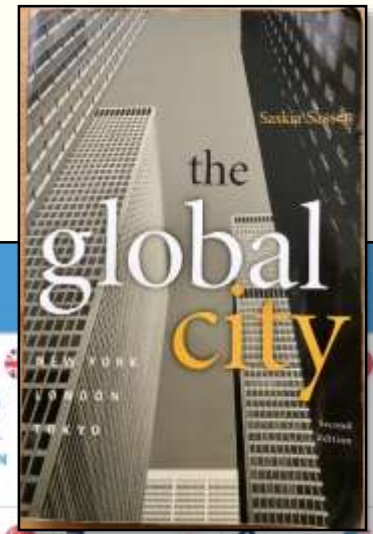
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 → *Object* (of research or practice) : places and their components



← *réf.:* Jacobs (2020) [1961]



← *réf.:* Harvey (2019) [2006]



← *réf.:* Sassen (1991)



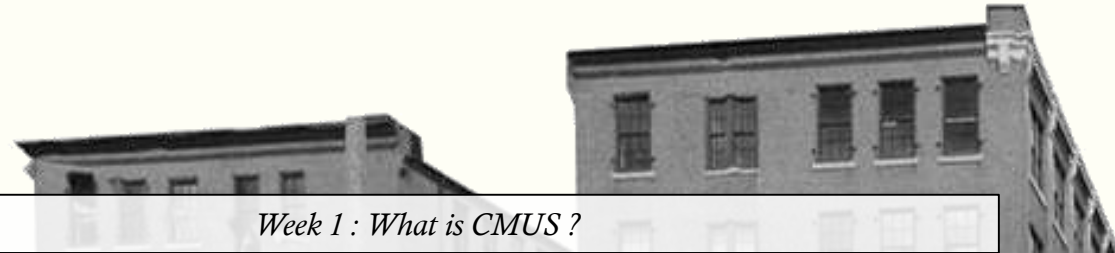
1 : Critical urban studies

- **The built environment from a different perspective**
 → *Subject* (of research or practice) : individuals and their actions

réf.: Schwarzman Scholars ↓

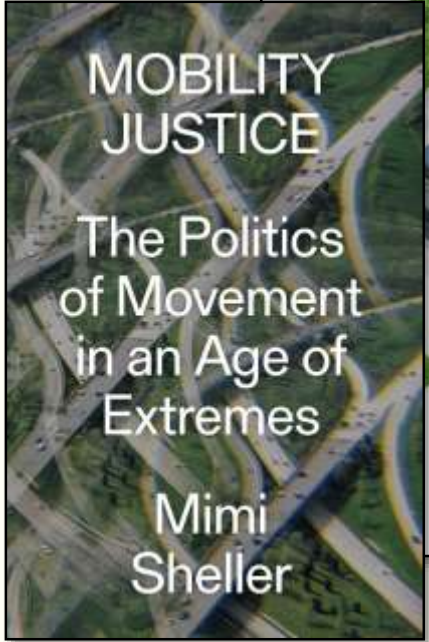


← réf.: ptvgroup.com

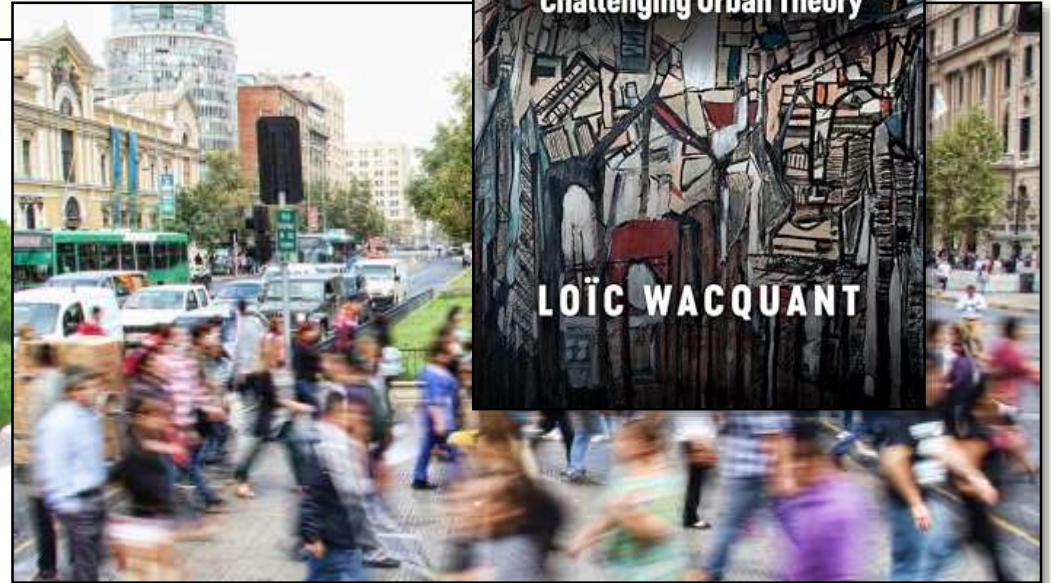


1 : Critical urban studies

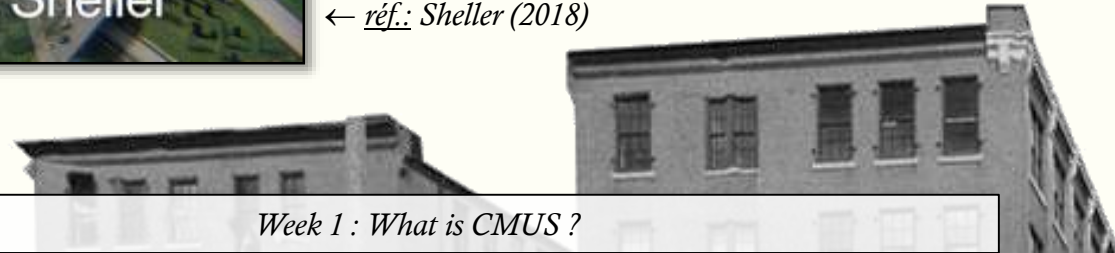
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← *réf.: Sheller (2018)*



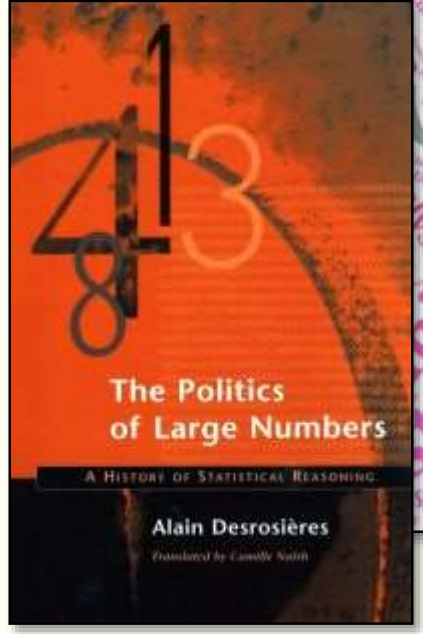
← *réf.: Wacquant (2022)*



1 : Critical urban studies

- The built environment from a different perspective
 - Stakeholders (of research or practice) : planners and their methods

réf.: Desrosières (2002) ↓



The collage includes a word cloud with terms such as 'Statistics', 'SPSS', 'R Language', 'Estimate', 'Confidence Interval', 'Decision Tree', and 'Statistical Inference'. It also features an aerial view of a city street with a yellow circle highlighting a specific area, and a screenshot of a journal article page from 'Urban Geography'.

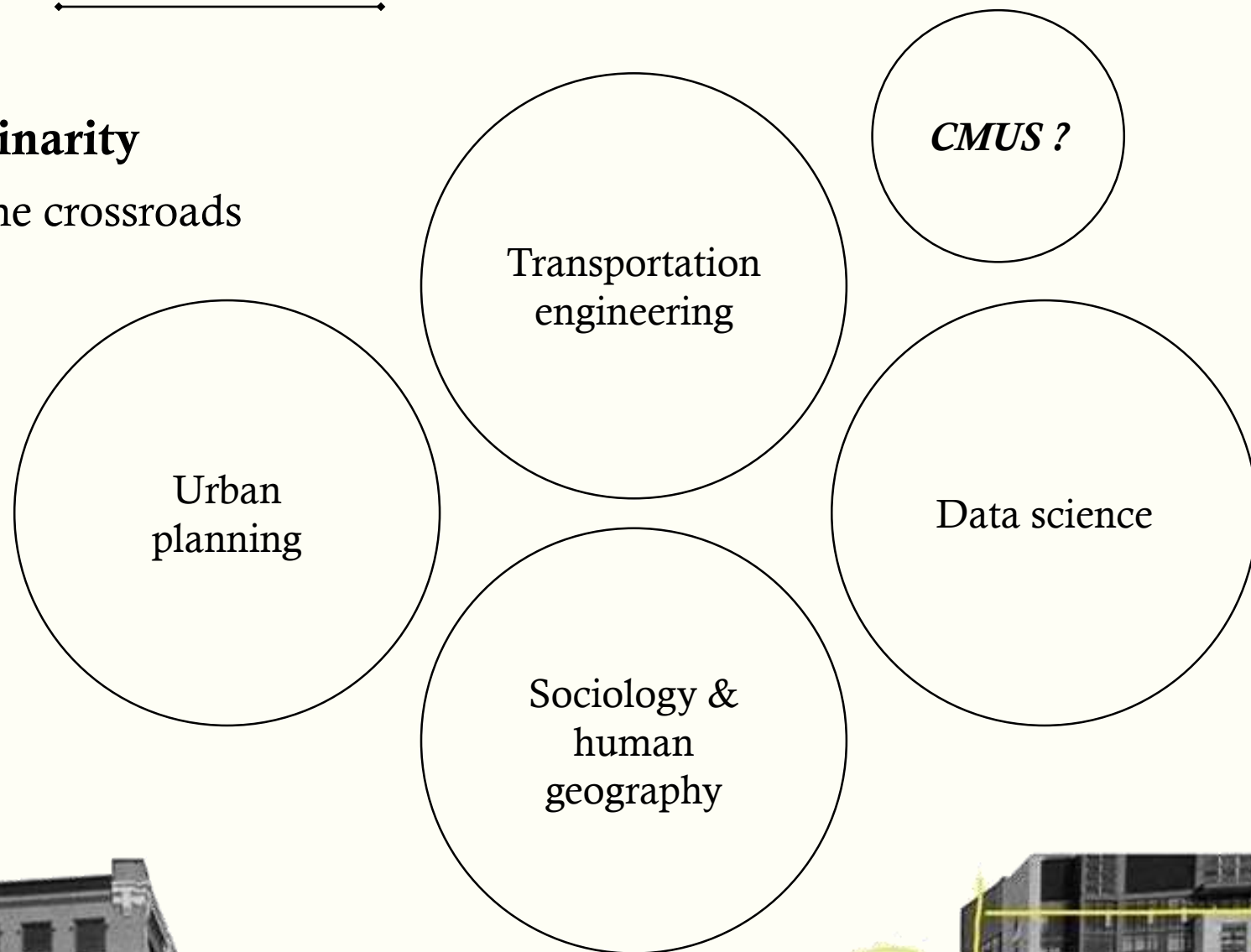
↑ réf.: Kęblowski & Bassens (2017)

1 : Critical urban studies

- **Agonistic & critical lecture of urban issues**
 - *Repoliticize* the built environment (space, place, scale).
 - *Denaturalize* individual practices and inter-individual relationships.
 - *Desacralize* professionals' (i.e., planners, policymakers, etc.) knowledge and expertise.
 - Theories from the social sciences about the urban and sustainability + computational tools to account for social and environmental inequalities.

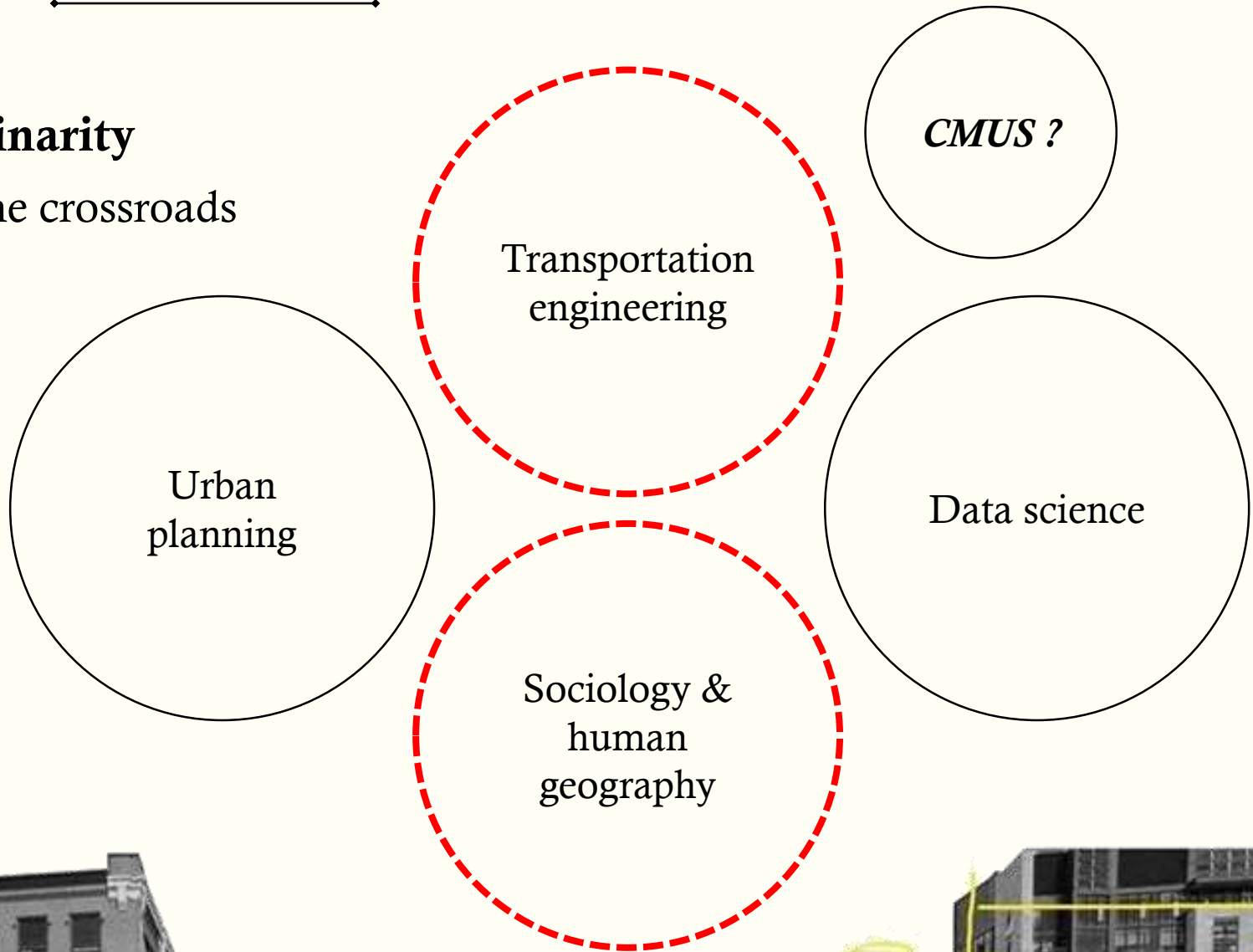
2 : Towards social engineering

- **The added value of interdisciplinarity**
 - CMUS lies – somewhere – at the crossroads of multiple disciplines.
 - This position is necessary to develop, promote, and advocate sustainable policies (i.e., environmentally and socially fair).



2 : Towards social engineering

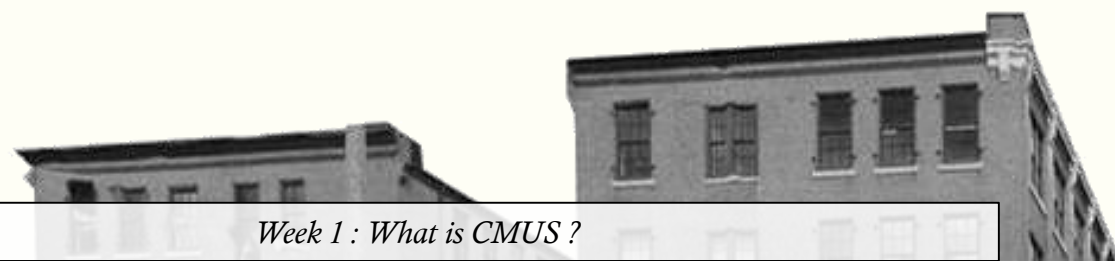
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2 : Towards social engineering

réf.: National Trust for Historic Preservation ↓

- Another take on...

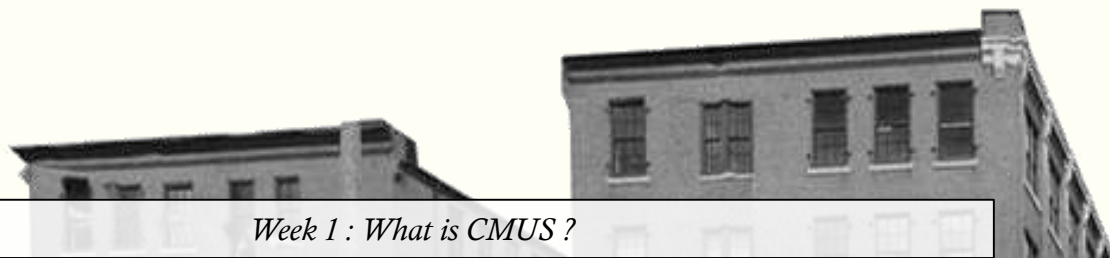


2 : Towards social engineering

- **Another take on the Moses vs. Jacobs controversy**
 - Robert Moses (1928) and Jane Jacobs (1916) as cultural figures of modern urban planning.
 - Tension around Washington Square Park and Hudson Street (1960s).
 - Highway proposal that would “cut through” Greenwich Village (1961).
 - Publishing of *Death and Life of the American City*.
 - Highway project was abandoned in 1968.
 - Legacy framed through the David vs. Goliath story.



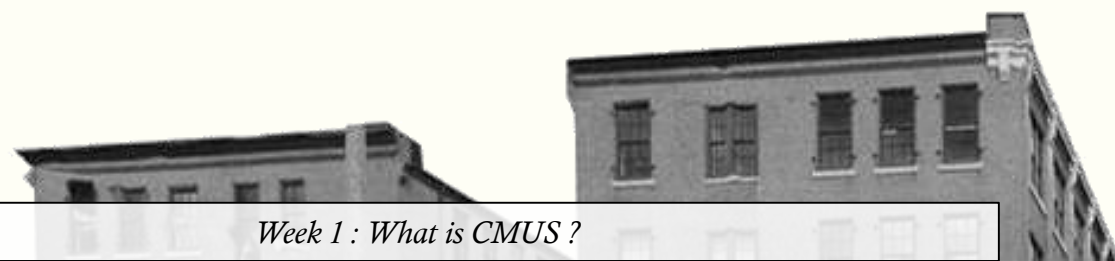
réf.: The Guardian ↑



2 : Towards social engineering

- Another take on the Moses vs. Jacobs controversy

<i>Characteristic</i>	Robert Moses	Jane Jacobs
<i>Planning the city</i>	Top-down urban renewal	Bottom-up grassroots urbanism
<i>Urban movement</i>	Modernism	Localism
<i>Transport modes</i>	Highways (cars)	Transit and active modes
<i>Reasoning</i>	Scientific rationalism	Organized complexity
<i>Scientificity</i>	Expert(s)' knowledge	Tacit knowledge
<i>Positionality</i>	Paternalist discourse	Inclusive discourse
<i>Personality</i>	Megalomaniac	Communitarian



2 : Towards social engineering

- **Another take on the Moses vs. Jacobs controversy**
 - A dichotomist and individualized understanding of the debate.
 - This prevents a critical discussion about social justice and gentrification.
 - Both lied at the frontier between popular and populism.
 - Both figures are now used as references for commodification.
 - Disembodiment and contextualization : analyze political economy and social forces over human flaws and mediatized charisma.

2 : Towards social engineering

- **The added value of *your own* interdisciplinarity**

- Interdisciplinarity is about understanding significant others while demonstrating one's own background.
- Interdisciplinarity is a matter of dialogue and discussion; it's a *scientifically sound debate*.

Urban
planning

Transportation
engineering

Data science

Sociology &
human
geography

3 : Reflexive quantification

- **Numbers (and maps) are *not* objective facts**
 - The built environment is described and lived through numbering techniques.
 - This knowledge is usually handled by, and sometimes restricted to, urban experts such as engineers, architects, urbanists, and data scientists...
 - ...a monopoly of urban expertise?

3 : Reflexive quantification

- **Numbers (and maps) are *not* objective facts**
 - While working with numbers, we need to avoid *quantitativism*.
 - Deduction (*vs.* description/induction).
 - Causality (*vs.* correlation).
 - Determinism and intentionality/rationality (*vs.* individuals inclined and reasonable).
 - Representativeness (*vs.* inclusivity/minorities).

3 : Reflexive quantification

- **Numbers (and maps) are *not* objective facts**

“The recurring question of whether a statistic ‘accurately reflects reality’ is a misleading shortcut imbued with the metrological realism of the natural sciences. Statistics transform the world through their very existence, by their dissemination and their argumentative, scientific, political, and journalistic uses.” (Desrosières, 2014, my translation)

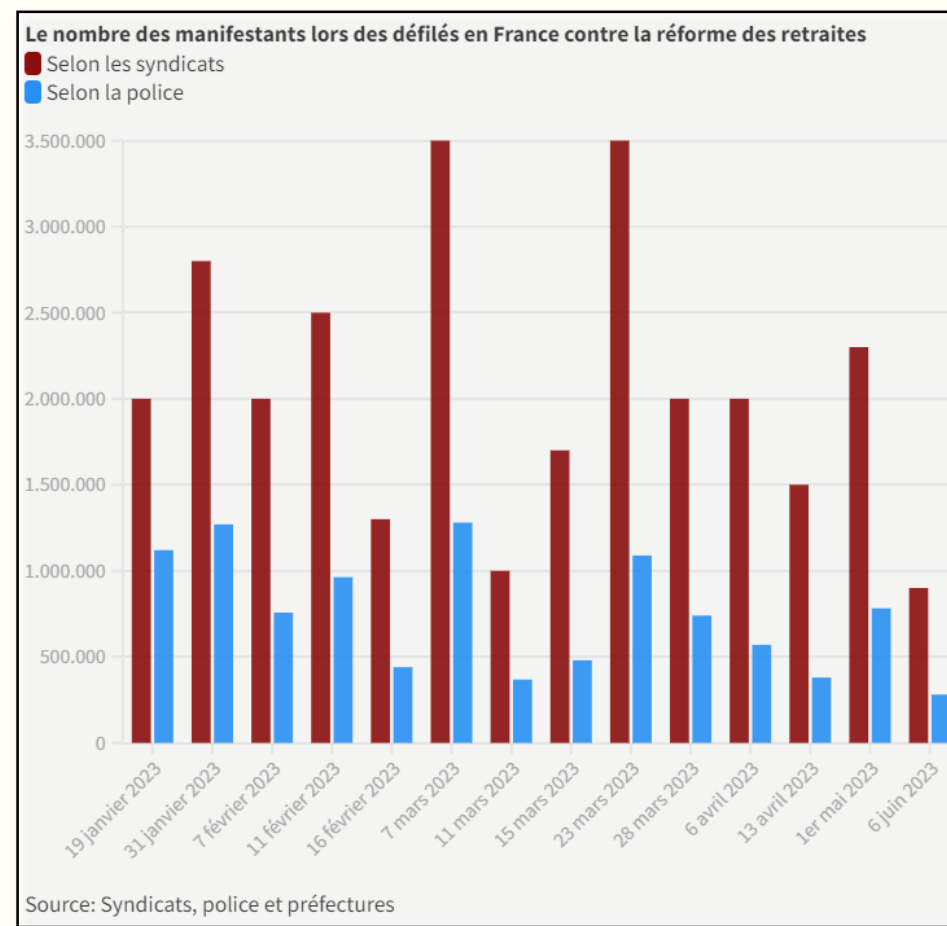
→ Numbers (and statistics) are *performative* and *embodied* instruments of power.

3 : Reflexive quantification

réf.: France Bleu ↓

- **How to decipher numbers?**

- A x3 factor appears between estimates from workers unions and the police.
- Private companies are now selling equipment that “do not provide another truth, but the reality”.
- Numbers matter... so does where they come from.



3 : Reflexive quantification

- **How to decipher numbers?**

- Going back to the grassroots of statistics...

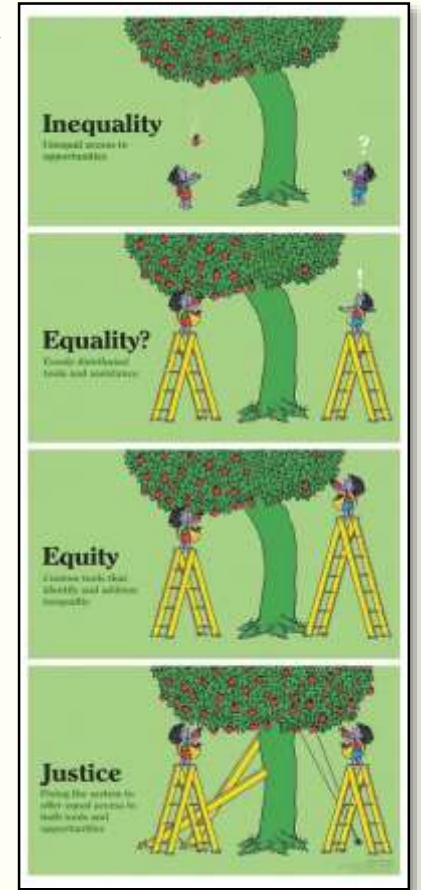
- They were instrumental to question and challenge implicit forms of domination – they served to highlight an injustice or something inexplicable.

- From measuring difference to measuring inequ(al)ity to guaranteeing... justice?

- Three dimension of a statistic : convention, technical device, power.

- Nation States confiscated statistics to dehumanize social processes (public opinion).

réf.: reddit →



3 : Reflexive quantification

- **How to decipher numbers?**
 - Fordism, Taylorism, clock-time, and the coordination of society.



réf.: e-international relations ↑

3 : Reflexive quantification

- How to decipher numbers?



↑ *réf.: Xerox*

3 : Reflexive quantification

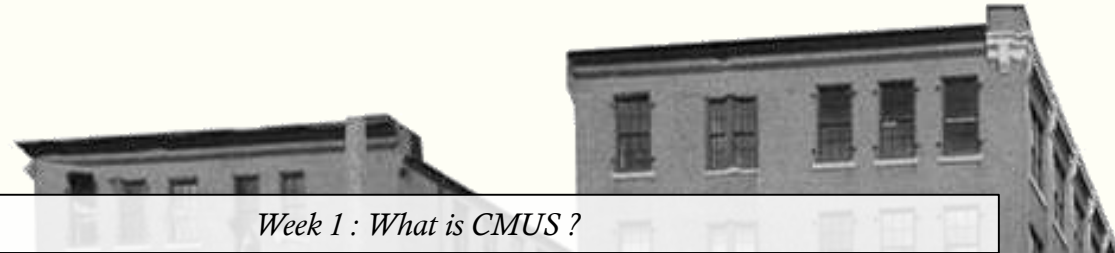
- How to decipher numbers?
→ The benchmarking era.



↑ *réf.: Xerox*



réf.: Bruno & Dider (2013) ↑



3 : Reflexive quantification

- **How to decipher numbers?**

- The benchmarking era.

- Incentive policy : introducing competition between social actors, creating injunction to produce, to go beyond fixed objectives to do better than others.

- Depoliticize : making decisions based on “undisputed results” over public and democratic debates.

- When measuring becomes the objective...



réf.: Bruno & Dider (2013) ↑

3 : Reflexive quantification

réf.: Bruno et al. (2008) →

- **How to decipher numbers?**

→ What about now...

→ A new regime of quantification : how to govern the algorithmic city... efficiency or obsolescence?

→ Going back to the emancipatory purposes of numbers?



3 : Reflexive quantification

- **Check-list for a “good use” of numbers and statistics in urban studies/planning**
 - ❑ Avoid *incommensurability* – numbers are helpless if they do not help our evaluation.
 - ❑ *Data* is never given – what we use was gathered for a specific purpose with various goals.
 - ❑ A double task : we need to *disenchant* numbers and to analyze the social process of their *enchantment*.
 - ❑ Numbers are not enough to refute theories *straightforwardly* – sustainable policies require evidence based rather than data driven research.

4 : Additional info

Week	Title	Theory & concept(s)	Method(s) & demo	Teacher(s)
1 8 Sep.	<u>Intro</u> : What is CMUS?	Critical urban studies, social engineering, reflexive quantification	Introduction to R	AG + CR
2 15 Sep.	<u>Practices</u> : (social) Space oddity	Social space, the system of automobility	Geometric data analysis, <i>bundle of practices</i>	AG
3 22 Sep.	<i>Bank holidays</i>			
4 29 Sep.	<u>Practices</u> : A Goofy motor mania	Theory of social practice, habitus, socialization, petro-masculinity	Latent variable analysis, structural equation modeling, <i>environmental care</i>	AG
5 6 Oct.	<u>Space/Territory</u> : "You can't build your way out of congestion"	Contentious politics, planetary urbanization, motonormativity	Web scrapping, automated transcription, content analysis, <i>highway infrastructure</i>	AG
6 13 Oct.	Atelier 1	Research question.		AG (online) + CR (onsite)
7 27 Oct.	Midterm presentation	Research question.		AG + CR



4 : Additional info

7 27 Oct.	Midterm presentation	Research question.		AG + CR
8 3 Nov.	<u>Space/Territory</u> : A most wanted need for speed	Dromology, social acceleration/deceleration mobility justice	GPS data analysis, macro to micro scale	AG + CR
9 10 Nov.	<u>Systems</u> : Complexity and networks	Complex systems and its urban applications	Social // spatial network analysis	CR
10 17 Nov.	Atelier 2	Data & methods.		AG (online) + CR (onsite)
11 24 Nov.	<u>Systems</u> : Prospective planning	“Everything is energy”, radical monopoly	Scenario design & prospective analysis, carbon accounting	CR <small>Office on</small>
12 1 Déc.	<u>Outro</u> : Sustainability transitions	Science & technology studies, sociotechnical transitions	Time series analysis, rhythms < <i>longue durée</i>	CR
13 8 Déc.	Atelier 3	Results & discussion.		AG (online) + CR (onsite)
14 15 Déc.	End-of-term presentation	Data & methods + results & discussion.		AG

4 : Additional info

- **Phases of the assessment**

- *Discovery phase* – choose any relevant topic related to urban studies and form affinity groups
- *Digestion phase* – formulate a research question building upon theories covered in class.
- Students will receive feedback during atelier 1 (October 13) before midterm presentation evaluation (October 27).
- *Sedimentation phase* – select appropriate data and methods to analyze the research question.
- Students will receive feedback during atelier 2 (November 17).
- *Consolidation phase* – provide results and create a dialogue with the existing literature.
- Students will receive feedback during atelier 3 (December 8) before the end-of-term presentation evaluation (methodological + empirical phases) (December 15).

4 : Additional info

- **Evaluation criteria**

- 40% for the research note (collective assessment, deadline : 21/12/2025).
- 20% for midterm & 20% for end-of-term presentation (individual assessment, total 40%).
- 20% for the personal reflection (individual assessment).

4 : Additional info

- **Use of AI in the context of CMUS**

- Learning : you're here to learn & develop your critical thinking.
- Integrity : ethical, cognitive, social & environmental implications.
- Transparency : if you do choose to use this tool, full disclosure required.
- Apertus : <https://www.swiss-ai.org/apertus>
- The 30-minute rule : <https://daniel.feldroy.com/posts/thirty-minute-rule>



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