# 11.s189 (undergrad) & 11.s955 (graduate)
# e-Planning, Urban Science & Digital Transition
## 3-credit mini-class

**Instructors**:

Pedro Ferraz de Abreu  (pfa@mit.edu)  & Joe Ferreira, jf@mit.edu

Brasil class : Muriel de Oliveira Gavira (mgfca@unicamp.br)

**Class sessions**: Thursdays, 2:30 – 4:00 pm, in 9-217 (starts Sept. 14)

Linked to: Monday Lunch Talks & Nov. 10 all-day Symposium

**For more information**

**Fall 2023 e-Planning website: http://web.mit.edu/uis/e-planning2023**

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# Format for 3-credit class

- ## Thursday (2:30 – 4:00 in 9-217 beginning Sept. 14)
  - International flavor with links to Brasil & Portugal
  - Small group discussion of Monday lunch talks and International Symposium

- ## Requirements
  - Attend Thursday discussion
  - Attend lunch talks and symposium (or view videos)
  - Short writeup (different for undergrad & grads)

- ## More details on e-Planning website
  - http://mit.edu/uis/e-planning2023

# Today's Outline

❖ **Questions & Comments**

    ❖ Finding readings & navigating website & Canvas (https://canvas.mit.edu/courses/21318)

    ❖ Managing interaction with Brasil class & zoomers

❖ **Discussion of 2 primary readings for today**

    – Bettencourt, L., & G. West, (2010) "A unified theory of urban living," Nature, 467, pp912-913

    – Acuto, M., S. Parnell, & K. Seto, (2018) "Building a global urban science," Nature Sustainability,

• **Breakouts to discuss 'urban science' issues**

    – Contrast articles, illustrate points, dig deeper

❖ **Draw lessons/questions from skimmed readings**

    – Use highlights to stimulate discussion

❖ **Look ahead** (on website: http://mit.edu/uis/e-planning2023)

    – For next week: Pedro's e-planning slides & notes

        ❖ *These sections will be recorded for class reuse*

**MIT**
**DUSP MIT**

**ICPPIT23**

## Massachusets Institute of Technology
## Dept. of Urban Studies and Planning

**www.e-planning.org**

### Fall 2023 Seminar on

# e-Planning

| Welcome | Lunch Speaker Series | <u>Associated Class</u> | Associated Symposium |
|---|---|---|---|
| Introduction & General information | *"Urban Science and Digital Transition: e-Planning, twenty years later"* | ***"e-Planning, Urban Science & Digital Transition"*** 11.S955 (grad) S189 (undergrad) | *International Conference on Public Participation and Information Technologies ICPPIT23* |
| Fall 2023, Sept-Dec | Monday's, 12-2PM | Thursdays, 2h30-4PM | 9-10 November 2023 |

**Local Index:** <u>Structure & Schedule</u> ; <u>Instructors</u>; <u>Goal & Rationale</u>; <u>Guidelines</u>; <u>Issues</u>; <u>Syllabus</u>; <u>Syllabus Details</u>; <u>Class Summaries</u>; <u>Bibliography</u>; <u>REGISTER</u>
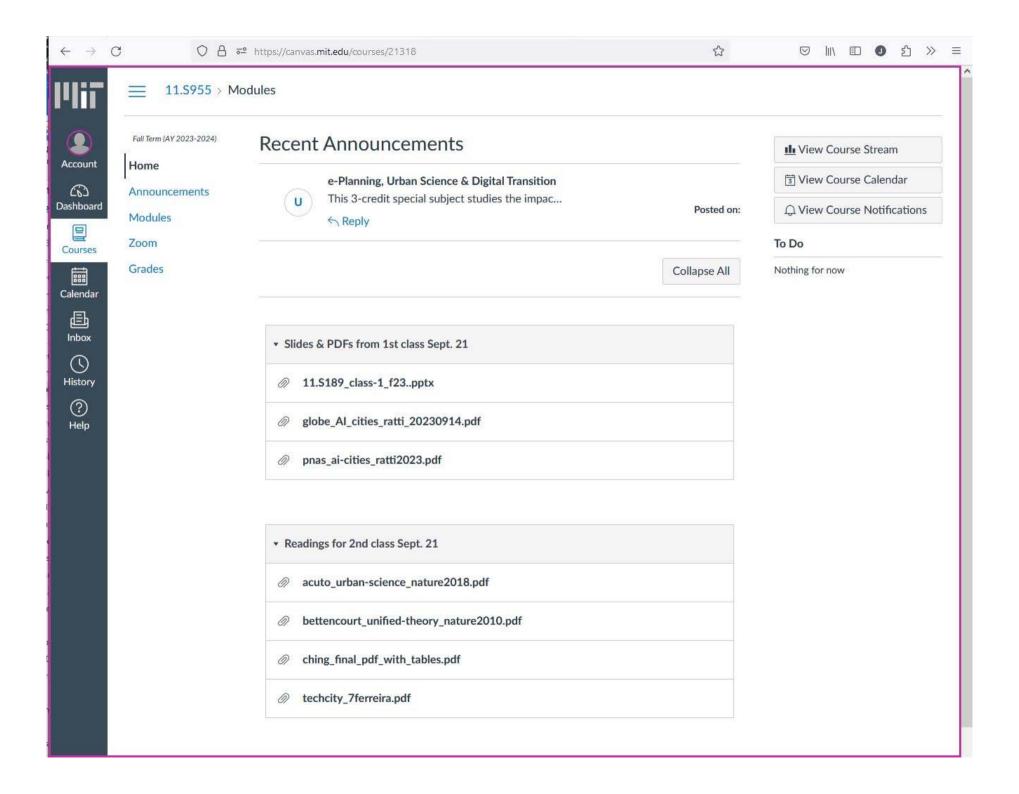
*"e-Planning, Urban Science & Digital Transition"* 11.S955 (grad) S189 (undergrad)

updated: 10 September 2023 (reload page for last update)

## Course Structure & Schedule

Beginning Sept. 14, 2023, in Room 9-217; Thursdays 14h30-16h

This special subject studies the impact of information and communication technologies (ICT) on community life, policy making and governance by addressing current major issues and research questions regarding e-Planning, Urban Information Systems, and Urban Science.

11.S955 > Modules

*Fall Term (AY 2023-2024)*

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## Recent Announcements

**e-Planning, Urban Science & Digital Transition**

U   This 3-credit special subject studies the impac...

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Collapse All

**▾ Slides & PDFs from 1st class Sept. 21**

🖉  11.S189_class-1_f23..pptx

🖉  globe_AI_cities_ratti_20230914.pdf

🖉  pnas_ai-cities_ratti2023.pdf

**▾ Readings for 2nd class Sept. 21**

🖉  acuto_urban-science_nature2018.pdf

🖉  bettencourt_unified-theory_nature2010.pdf

🖉  ching_final_pdf_with_tables.pdf

🖉  techcity_7ferreira.pdf

**Il View Course Stream**

**🗓 View Course Calendar**

**🔔 View Course Notifications**

**To Do**

Nothing for now

# Prep for today

What do we mean by 'e-planning' & 'urban science'

•MIT Tech Review (cities issue, 2021)
https://www.technologyreview.com/magazines/the-cities-issue

❖Acuto, M., S. Parnell, & K. Seto, (2018) "Building a global urban science," Nature Sustainability, https://doi.org/10.1038/s41893-017-0013-9

❖Bettencourt, L., & G. West, (2010) "A unified theory of urban living," Nature, 467, pp912-913, https://www.nature.com/articles/467912a

•Ching,TY. & Ferreira Jr., J. (2015) "Smart cities: Concepts, perceptions and lessons for planners", **Planning Support Systems and Smart Cities**, Gertman, Ferreira, Goodspeed, Stillwell (editors). 145-168.

•Ferreira Jr., J., (1999). "Information Technologies that Change Relationships between Low-Income Communities and the Public and Non-profit Agencies that Serve Them", Ch. 7 in **High Technology and Low-Income Communities**, MIT Press, Schon, Mitchell, Sanyal (editors), MIT Press

❖ Read these two and browse the other 3

❖ PDFs for non-public articles are on canvas.mit.edu

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# Bettencourt & West (2010, Nature)
# A unified theory of urban living

- ## What is main argument of paper?
  - New data/computation/analysis lead to new insights about persistent urban growth laws
  - Many persistent non-linear relationships link city size to city outputs
    - Scale economies (density & productivity & specialization)
- ## What steps (policy & research) are advocated?
  - Methods from physics can discover immutable scaling laws linking city size and activity
  - Relationships cross domains: economic activity, social interaction, mobility, crime, geography, design, …
  - Seeks 'grand unified theory of sustainability' with cities and urbanization at its core
  - Policy led by a new quantitative understanding of cities

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# Acuto, Parnell, Seto (2018)
## Building a global urban science

- **What is main argument of paper?**
  - Across academia, urban knowledge is out-dated and underfunded
  - Incoherent 'urban science' due to siloed study of disciplinary domains (economics, health, planning, engineering, and design)

- **What steps (policy & research) are advocated?**
  - Reorganization of urban data systems, urban education, urban research
  - Urban Science for global sustainability
  - Attention to variation in urban conditions

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# Comparing the two papers

- Two variations of same theme? Contradictory?
  - Quantitative analysis of new data to 'understand' cities
  - Need for interdisciplinary research
  - 2010: Discover scaling laws that govern urban growth
  - 2018: Urban science for global sustainability
- Why is current urban research inadequate?
  - How have silos been second-best?
  - Futile efforts to deviate from scaling laws
  - Technical innovation/analysis misses important issues, behaviors, consequences
- What is recommended?
  - 'Urban Science', better data, interdisciplinary research
  - Physics-based modeling of complex urban systems
  - New academic programs: SCoC, urban informatics, Sustainability School, …
- What has happened since papers were written?
  - Smart Cities, computational social science, GEOSS effort, …
  - Worsening social inequality, climate change, wealth concentration, threats to democracy

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# Ching & Ferreira (2015)
## Smart cities: Concepts, perceptions and lessons

- Paper from MCP thesis of Tuan-Yee Ching (Singapore)
- Based on case studies of 6 'smart' cities (Boston, San Francisco, Amsterdam, Stockholm, Singapore and Rio de Janeiro)
- Four theories
  - Smart machines & informated organizations (Zuboff, 1989)
  - Partnerships and collaborations
  - Learning, relearning, and adapting (Schon)
  - Investing for the future
- Useful tables comparing cities & extracting lessons and best practices

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Ferreira (1999)
Information Technologies that Change Relationships between Low-Income Communities and the Public and Non-profit Agencies that Serve Them

- Implications of better public data about land use and ownership
  - Who owns / controls the land and buildings in a neighborhood
  - Organizations might spend months pouring over paper records

- Digital maps/records greatly speed up processing and analysis
  - BUT, spelling errors complicate effort to aggregate common ownership
    - E.g. to see if developer is amassing land in neighborhood
  - Several dozen spelling of Boston Redevelopment Authority (now BPDA)
  - Hard to fix: state registry of deeds with legal names of owners; city agency with maps, database; shell companies hide ownership; …

- How to 'fix' the problem
  - Top down vs. bottom-up vs. middle-out
  - Relational database management tools can help
  - But, they require infrastructure (more tech-able staff)

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# Other related readings

- MIT Tech Review (cities issue, 2021)
  - Background for discussion later in semester
- Zhuangyuan Fana, Fan Zhang, Becky P. Y. Loo, and Carlo Ratti (2023) "[Urban visual intelligence: Uncovering hidden city profiles with street view images](#)", PNAS, 2023
  - High correlation between neighborhood statistics (VMT, socio-economics, and crime) and computer vision model trained on Google Street View images.
- Ratti, Carlo and Picon, Antoine (2023) "[AI is coming to our neighborhoods and will show us the future of cities](#)", op-ed letter in Boston Globe, September 14, 2023

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# Issues for further discussion

- Pedro's PhD thesis (2002) examining computerization of environmental reviews of development proposals.
- What limits the effectiveness of tech implementation
  - Differences between scaling laws in physics and urban planning
- How to do meaningful interdisciplinary research
- What do disciplines/professionals have to say about technology
- Recurring themes:
  - behavioral modeling; game theory vs. isolated choices; trust/coalition-building; temporal/distributional mismatches;  automating/informating,

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# For next class (Thursday, Sept. 28)

- Pedro will present his conception of e-Planning
- Skim these materials (we will return to them during the semester)
  - Ferraz de Abreu, P. (2022), "e-Planning: Why, When, Where, How, What, Who", 141 slides, e-planning editions
  - Ferraz de Abreu, P. (2021) "The Qualitative Leap of the Information & Communication Technologies" bilingual chapter, pp.47-72 , e-Planning & Ubiquity, C-Press
  - Ferraz de Abreu, P. & Ferreira Jr., J. (2003), "Towards a Research Agenda on e-Planning", MIT-DUSP
- Links are on class website under <u>class summaries</u>

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Only for class lists and non-public reading

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