

MIT Department of Urban Studies and Planning

1.251/11.526: Comparative Land Use and Transportation Planning
Spring 2020 | Thursday: 14:00-17:00 Room: **66-148 [TBC]**

Instructor: Fábio Duarte, Lecturer and Principal Research Scientist, DUSP

fduarte@mit.edu | office hours: Thursdays, 11:45-13:45 office hours sign up (must have MIT certificates): <http://dusp.mit.edu/officehours>

TA: Annie Hudson, awhudson@mit.edu: office hours: Tuesdays, 17:00-19:00 (sign up via email)

Course Description

This course focuses on the interaction between land use and transportation along multiple scales, ranging from the metropolitan lens to the curbside one. The course aims to develop an understanding of relevant theories and analytical techniques, as well as a critical approach to contemporary challenges fostered by new technologies, through the exploration of various cases drawn from different parts of the world.

During the first module of the course, students will develop a basic understanding of the indissociable relation between transportation and land use.

The second module will introduce the major forces, patterns and trends linking transportation and land use, including metropolitan growth and governance, suburbanization, accessibility, environmental, social and health impacts policies and design.

Building on these foundations, in the third module, students will learn key concepts and analytical models to assess the relation between transportation and land use, including travel demand and travel behavior, and the influence of the built environment and urban form in transportation. Additionally, students will learn about two special topics: Transit Oriented Development (TOD) and high-speed rail boosting the urbanization of new Chinese towns.

The fourth module of the course turns to the exploration of how new technologies and scales might change the way we examine the relation between transportation and land use, including autonomous vehicles and curbside management.

Finally, in the fifth module students will present case studies addressing different topics discussed during the course, building on real cases in different contexts.

Learning Objectives

By the end of the course, students should have developed:

- An understanding of transportation and land use interaction theories, including issues related to accessibility, travel demand, urban structure, and location theory;

- An ability to interpret the influence of land use on travel behavior, accounting for potential variation in estimated effects due to the spatial scale of analysis, analytical approach, and data used;
- Skills for assessing urban form and design from the perspective of travel behavior;
- An understanding of the impacts of transportation infrastructure on land development;
- An ability to critically evaluate policies aimed to influence the transportation-land use interaction space;
- A knowledge of the various relevant policy instruments, institutional settings, and analytical tools.
- A critical approach to contemporary opportunities and challenges faced by planning authorities dealing with transportation planning and land use.

For students with the need/interest, special session(s) will be organized to give students a basic aptitude in understanding regression models; geographic information systems (GIS) and databases; and transportation levels of service measurement.

Course Requirements

The course meets once a week for lectures and class work and discussions. In addition to regular class sessions, the TA will occasionally conduct non-mandatory discussions. There are no formal prerequisites for the course; however, students should have some understanding of, and facility with, statistics. Students are expected to come to class having read the required readings for the week.

Course Materials

All of the course readings are listed on the syllabus below and are available online:
<https://learning-modules.mit.edu/class/index.html?uuid=/course/11/sp20/11.526#info>.

<https://learning-modules.mit.edu/class/index.html?uuid=/course/11/sp20/11.526#info>

Additional readings are also listed for your benefit; going over them is entirely optional. Please contact the TA if you have any problems with accessing the materials.

Special Accommodations

If you have a documented disability, or any other problem you think might affect your ability to perform in class, please see the instructor early in the semester so that arrangements may be made to accommodate you.

Class exercises, Assignments and Grading

	Value	Posted	Due
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Assignment 1 Land use and transportation in your neighborhood	10%	2/6	2/20
Class exercise 1 [pairs] Land use and transportation in your neighborhood	5%	2/20	2/27
Assignment 2 Accessibility in the metropolis	10%	2/27	3/5
Class exercise 2 [pairs] Social, environmental and health impacts of land use-transportation link	5%	3/5	3/12
Assignment 3 [pairs] Shaping travel behavior by design	15%	3/12	4/2
Class exercise 3 [pairs] Autonomous vehicles: policies and design	5%	4/16	4/23
Assignment 4: case studies 5-minute presentation	15%	4/2	4/30 + 5/7
Final Assignment: Project Analysis Critical assessment of development plans	35%	3/19	5/7

* When not otherwise marked, assignments are individual. Late submissions for all assignments will be penalized, except in cases of documented disabilities or arrangements with the instructor.

Academic Integrity

Plagiarism and cheating are not tolerated. Never (1) turn in an assignment that is not your own original work, or (2) turn in an assignment for this class that you previously turned in for another class. Anyone caught cheating on an assignment will be reported to the provost in line with recognized university procedures. This may result in a failing grade for the class, and possibly even suspension from MIT. Please see the instructor if you have any questions about what constitutes plagiarism, and visit the MIT policy on Academic Integrity:

<http://web.mit.edu/academicintegrity/>

Calendar

MODULE 1: INTRODUCTION TO LAND USE AND TRANSPORTATION PLANNING
Lecture 1: February 6
Course overview, objectives, expectations, logistics, student interests.

Part 1: Teaching and learning land use and transportation planning.

Required Readings

- Krizek, K., & Levinson, D. (2005). Teaching Integrated Land Use–Transportation Planning. Topics, Readings, and Strategies. *Journal of Planning Education and Research* 24:304-316.
- King, D., Krizek, K. J., & Levinson, D. (2008). Designing and Assessing a Teaching Laboratory for an Integrated Land Use and Transportation Course. *Transportation Research Record*, 2046(1): 85–93.

Part 2: Why comparative land use and transportation planning?

Required Readings

- Budds, D. (2018). The future of urban mobility will be shaped by these six issues. *Curbed*, December 27:
<https://www.curbed.com/2018/12/18/18144513/futuremobility-autonomous-vehicles-cooper-hewitt>
- Glaeser, E. (2011). To Get America Growing Again, It's Time to Unleash Our Cities. *Freakonomics blog*, February 14:
<http://www.freakonomics.com/2011/02/14/to-getamerica-growing-again-its-time-to-unleash-our-cities-a-guest-post-by-edglaeser/>
- O'Sullivan, F. (2012). Why I Moved Back to the Suburbs. *Citylab - The Atlantic*, August 23:
<http://www.theatlanticcities.com/housing/2012/08/why-suburbs-have-citybeat/3041/>
- Pisarski, A. (2010). Livability and all that. *New Geography blog*, November 12:
<http://www.newgeography.com/content/001865-livability-andall-that>

Additional Readings

- Glaeser et al. (2008). Why do the poor live in cities? The role of public transportation. *Journal of Urban Economics*, 63: 1-24.
- UN Habitat. (2013). Planning and Design for Sustainable Urban Mobility, Global Report on Human Settlements 2013, London: Routledge, Ch 1. "The Urban Mobility Challenge" and Ch 10 "Toward Sustainable Urban Mobility."

**** Assignment 1out:** Explore the land use-transportation interaction [your hometown, individual]

MODULE 2: FORCES, PATTERNS, TRENDS, CONCERNS

Lecture 2: February 13 [Christopher Zegras]

Part 1: Metropolitan-ization forces, patterns, trends, and concerns

Required Readings

- Glaeser, E. (1998). Are Cities Dying? *The Journal of Economic Perspectives*, 12(2): 139-160.
- Ingram, G. (1998). Patterns of Metropolitan Development: What Have We Learned? *Urban Studies*, 35(7): 1019-1035.

Mahtta, R., Mahendra, A., & Seto, K. (2019). Building up or Spreading out? Typologies of Urban Growth across 478 Cities of 1 million+. *Environmental Research Letters*, 14(12): 1-11.

** If you don't have a background in public goods, read also: Holcombe, R. G. (1997). A theory of the theory of public goods. *The Review of Austrian Economics* 10(1): 1-22. 5

Part 2: Metropolitan governance

Required Readings

Feiock, R. C. (2009). Metropolitan Governance and Institutional Collective Action. *Urban Affairs Review*, 44(3): 356-377.

Rayle, L. & Zegras, C. (2013). The Emergence of Inter-Municipal Collaboration: Evidence from Metropolitan Planning in Portugal. *European Planning Studies*, 21(6): 867-889.

Additional Readings

Zegras, C. Metropolitan Governance for Sustainable Mobility. (2017). Chapter 2.8 in *Steering the Metropolis*. Gómez-Álvarez, D, R. Rajack, E. López-Moreno, G. Lanfranchi, editors. Inter-American Development Bank.

Lecture 3: February 20

Part 1: Parking

Required Readings

Pierce, G. & Shoup, D. (2013). Getting the Prices Right. *Journal of the American Planning Association*, 79(1): 67-81.

Shoup, D. (2004). The Ideal Source of Local Public Revenue. *Regional Science and Urban Economics*, 34: 753-784

Wilson, R. (2013). Parking Reform Made Easy. *Access Magazine*, 43: 29-34.

Additional Readings

Ben-Joseph, E. (2012). *ReThinking a Lot: The Design and Culture of Parking*. Cambridge, MA: MIT Press.

Shoup, D. (2011). *The High Cost of Free Parking*. Chicago: Planners Press.

Part 2: [Class exercise 1: land use-transportation interaction \[selected sites, in pairs\]](#)

**** Assignment 1 due**

Lecture 4: February 27 [Christopher Zegras]

Part 1: Accessibility: Land use—transportation link

Required Readings

Handy, S.L. & Clifton, K.J. (2001). Evaluating Neighborhood Accessibility: Possibilities and

Practicalities. *Journal of Transportation and Statistics* (September/December): 67-78.

Geurs, K.T. & van Wee, B. (2004). Accessibility Evaluation of Land-Use and Transport Strategies: Review and Research Directions. *Journal of Transport Geography*, 12: 127-140.

Lynch, K. (1984). Access. Chapter 10 in *Good City Form*, 187-204. MIT Press.

Wachs, M. (2010). Transportation Policy, Poverty, and Sustainability: History and Future. *Transportation Research Record: Journal of the Transportation Research Board*, 2163(1): 5-12.

Part 2: Accessibility: Operationalization

Required Readings

Levine, J., Grengs, J., Shen, Q., & Shen, Q. (2012). Does accessibility require density or speed? A comparison of fast versus close in getting where you want to go in US metropolitan regions. *Journal of the American Planning Association*, 78(2): 157-17.

Martens, K. & Golub, A. (2018). A Fair Distribution of Accessibility: Interpreting Civil Rights Regulations for Regional Transportation Plans. *Journal of Planning Education and Research*. Online First: 1-20.

Páez, A., D. Scott, & Morency, C. (2012). Measuring accessibility: positive and normative implementations of various accessibility indicators. *Journal of Transport Geography*, 25: 141-153.

**** Class Exercise 1 due**

**** Assignment 2 out:** Accessibility in the metropolis [[individual](#)]

Lecture 5: March 05

Part 1: Environmental impacts of land use and transportation choices

Required Readings

Barbour, E. & Deakin, E. (2012). Smart Growth Planning for Climate Protection. *Journal of the American Planning Association*, 78(1): 70-86.

Kahn, M., & Morris, E. (2009). Walking the Walk: The Association Between Community Environmentalism and Green Travel Behavior. *Journal of the American Planning Association*, 75(4): 389-405.

Sperling, D. & Eggert, A. (2014). California's climate and energy policy for transportation. *Energy Strategy Reviews*, 5: 88-94.

Additional Readings

Boarnet, M. (2010). Planning, climate change, and transportation: Thoughts on policy analysis. *Transportation Research Part A: Policy and Practice*, 44(8): 587-595.

Part 2: Transportation, land use, and health

Required Readings

- Brownson, R., et al. (2009). Measuring the Built Environment for Physical Activity: State of the Science. *American Journal Preventive Medicine*, 36(4 Suppl): 99-123).
- Frank, L. D. (2000). Land Use and Transportation Interaction: Implications on Public Health and Quality of Life. *Journal of Planning Education and Research*, 20(1), 6–22.
- Stevenson, M., Thompson, J., Sá, T. H., Ewing, R., Mohan, D., McClure, R., . . . Woodcock, J. (2016). Land use, transport, and population health: Estimating the health benefits of compact cities. *The Lancet*, 388(10062), 2925-2935.

Additional Readings

- Reis, R., et al. (2016). Scaling up physical activity interventions worldwide: stepping up to larger and smarter approaches to get people moving. *The Lancet*, 388(10051): 1337–1348.
- Su, S., Zhang, Q., Pi, J., Wan, C., & Weng, M. (2016). Public health in linkage to land use: Theoretical framework, empirical evidence, and critical implications for reconnecting health promotion to land use policy. *Land Use Policy*, 57, 605-618.

**** Assignment 2 due**

**** Class exercise 2:** [Social, environmental and health impacts of land use-transportation link](#)

Required Readings

- Badger, E. (2014). This Map Wants to Change How you Think About Your Commute. *CityLab* - *The Atlantic*, 28 January:
<http://www.citylab.com/commute/2014/01/map-wants-change-how-you-think-about-your-commute/8197/>

Resources

- Accessibility Observatory: <http://access.umn.edu>
Transit Analyst: <https://transitanalyst.com/>
Travel Time Platform: <https://app.traveltimeplatform.com>

MODULE 3: KEY CONCEPTS AND ANALYTICAL TOOLS

Lecture 6: March 12 [**Christopher Zegras**]

Part 1: Travel Demand

Required Readings

- Mokhtarian, P., Salomon, I., & Singer, M. (2015). What Moves Us? An Interdisciplinary Exploration of Reasons for Traveling. *Transport Reviews*, 35(3): 250-274.
- Schafer, A. (2000). Regularities in Travel Demand: An International Perspective. *Journal of Transportation and Statistics*, December: 1-31.

Additional Readings

- Cervero, R. (2006). Alternative Approaches to Modeling the Travel-Demand Impacts of Smart Growth. *Journal of the American Planning Association*, 72(3): 285-295.
- Hjorthol, R.J. (2008). The Mobile Phone as a Tool in Family Life: Impact on Planning of Everyday Activities & Car Use. *Transport Reviews*, 28(3): 303-20.

Part 2: Land Use and Travel Behavior

Required Readings

- Cao, X., Mokhtarian, P., & Handy, S. (2009). Examining the Impacts of Residential Self-Selection on Travel Behaviour: A Focus on Empirical Findings. *Transport Reviews*, 29(3):359-395.
- Crane, R. (2000). The Influence of Urban Form on Travel: An Interpretive Review. *Journal of Planning Literature*, 15(1): 3-23.
- Maat, K., van Wee, B., & Stead, D. (2005). Land use and travel behavior: expected effects from the perspective of utility theory and activity-based theories. *Environment and Planning B: Planning and Design*, 32: 33-46.

Additional Readings

- Alta Planning + Design. (2017). *Measures for success: new tools for shaping transportation behavior - Report*. New York: TransitCenter.
- Lin, J., and Yang, A. (2009). Structural Analysis of How Urban Form Impacts Travel Demand: Evidence from Taipei. *Urban Studies* 46:1951-1966
- Zegras, C. Lee, J.-S., Ben-Joseph, E. 2012. By community or design? Age-Restricted Neighborhoods, Physical Design and Baby Boomers' Local Travel Behavior in Suburban Boston, USA. *Urban Studies*, 49(10): 2169–2198.

**** Class Exercise 2 due**

**** Assignment 3 out: Shaping travel behavior by design [pairs]**

Lecture 7: March 19

Part 1: Transit Oriented Development: Theory, instruments and examples

Required Readings

- Duarte, F. & Ultramari, C. (2011) Making public transport and housing match: Accomplishments and failures of Curitiba's BRT. *Journal of Urban Planning and Development*, 138 (2): 183-194.
- Duncan, M. (2010). The Impact of Transit-oriented Development on Housing Prices in San Diego, CA. *Urban Studies*, 48(1): 101-127.
- Loo, B., Chen, C., Chan, E. (2010). Rail-based transit-oriented development: Lessons from New York City and Hong Kong. *Landscape and Urban Planning*. 97(3): 202-212.
- Lund, H. (2007). Reasons for Living in a Transit-Oriented Development, and Associated

Transit Use. *Journal of the American Planning Association*, 72(3): 357-366.

Additional Readings

Mercier, J., Carrier, M., Duarte, F., & Tremblay-Racicot, F. (2016). Policy tools for sustainable transport in three cities of the Americas: Seattle, Montreal and Curitiba. *Transport Policy*, 50: 95-105.

Smolka, M. O. & Ambroski, D. (2007). Value Capture for Urban Development, an Inter-American Comparison. *Lincoln Land Institute Working Paper*, August.

Part 2: High-speed rail and urbanization in China [guest lecturer: Siqi Zheng]

Required Readings

Dong, X., Zheng, S., & Kahn, M. (2019). The Role of Transportation Speed in Facilitating High Skilled Teamwork Across Cities. *Journal of Urban Economics*, (in press: DOI: 10.1016/j.jue.2019.103212).

Jiao, J., Wang, J., & Jin, F. (2017). Impacts of high-speed rail lines on the city network in China. *Journal of Transport Geography*, 60: 257-266

Qin, Y. (2017). 'No county left behind?' The distributional impact of high-speed rail upgrades in China. *Journal of Economic Geography*, 17(3): 489-520.

Additional Readings

Chen, Z., & Haynes, K. (2017). Impact of high-speed rail on regional economic disparity in China. *Journal of Transport Geography*, 65: 80-91.

**** Final Assignment out:** Project Assessment [[individual](#)]

SPRING BREAK: March 26

Lecture 8: April 02

Part 1: Urban form: driver or response?

Required Readings

Barrington-Leigh, C., & Millard-Ball, A. (2015). A century of sprawl in the United States. *Proceedings of the National Academy of Sciences*, 112(27): 8244-8249.

Hamidi, S., & Ewing, R. (2014). A longitudinal study of changes in urban sprawl between 2000 and 2010 in the United States. *Landscape and Urban Planning*, 128: 72-82.

Baum-Snow, N.(2007). Did Highways Cause Suburbanization? *Quarterly Journal of Economics*, 122(2): 775-805.

Part 2: Travel behavior and built environment: a matter of scale?

Required Readings

Ewing, R. & Cervero, R.(2010). Travel and the Built Environment. *Journal of the American Planning Association*, 76(3): 365-294.

Zegras, C. (2010). The Built Environment and Motor Vehicle Ownership and Use: Evidence

from Santiago de Chile. *Urban Studies*, 47(8): 1793–1817.
Naess, P. (2011). “New urbanism” or metropolitan-level centralization? A comparison of the influences of metropolitan-level and neighborhood-level urban form characteristics on travel behavior. *Journal of Transport and Land Use*, 4(1): 25–44

Additional Readings

Dujardin, S., Pirart, F., Brévers, F., Marique, A.-F., and Teller, J. (2012). Home-to-work commuting, urban form and potential energy savings: A local scale approach to regional statistics. *Transportation Research Part A*, 46(7): 1054–1065.
Kim, S., Park, S., & Lee, J.S. 2014. Meso- or micro-scale? Environmental factors influencing pedestrian satisfaction. *Transportation Research Part D*, 30: 10-20.

**** Assignment 3 due**

**** Assignment 4 out:** case studies [\[pairs\]](#)

Lecture 9: April 09

Part 1: Big data and urban mobility

Required Readings

Manley, E., Zhong, C. & Batty, M. (2018). Spatiotemporal variation in travel regularity through transit user profiling. *Transportation*, 45: 703–732.
O'Brien, O., Cheshire, J., & Batty, M. (2014). Mining bicycle sharing data for generating insights into sustainable transport systems. *Journal of Urban Geography* 34: 262-273.
Vazifteh, M., Santi, P., Resta, G., Strogatz, S. H. & Ratti, C. (2018). Addressing the minimum fleet problem in on-demand urban mobility. *Nature*, 557: 534–538.

Additional Readings

Batty, M. (2015). Editorial: Models Again: their role in planning and prediction. *Environment and Planning B: Planning and Design*, 42: 191–194.
Batty, M. (2008). The Size, Scale, and Shape of Cities. *Science*, 319: 769-771.
Zhu, Y., M. Diao, J. Ferreira, C. Zengras. 2018. An Integrated Microsimulation Approach to Land Use and Mobility Modeling. *Journal of Transport and Land Use*, 11(1), pp. 633-659.

Part 2: Digital platforms for transportation and land use planning [**guest lecturer: TBD**]

City Scope, MIT Media Lab (<https://www.media.mit.edu/projects/cityscope/overview/>)
Coax, MIT Mobility Futures Collaborative
(<https://mfc.mit.edu/innovations-participatory-design-brt-systems>)

MODULE 4: SHAPING THE FUTURE: TECHNOLOGIES AND SCALES

Lecture 10: April 16

Part 1: Autonomous Vehicles: challenges and opportunities for land use and transportation

Required Readings

- Fagnant, D., Kockelman, K. (2015). Preparing a nation for autonomous vehicles: opportunities, barriers and policy recommendations. *Transportation Research Part A: Policy and Practice* 77, 167-181.
- Freemark, Y., Hudson, A., Zhao, J. (2019). Are Cities Prepared for Autonomous Vehicles? Planning for Technological Change by U.S. Local Governments. *Journal of the American Planning Association*, 85(2), 133-151.
- Guerra, E. (2016). Planning for cars that drive themselves: Metropolitan Planning Organizations, regional transportation plans, and autonomous vehicles. *Journal of Planning Education and Research*, 36(2), 210-224.

Additional Readings

- Awad, E., Dsouza, S., Kim, R., Schulz, J., Henrich, J., Shariff, A., Bonnefon, J-F., Rahwan, I. (2018). The Moral Machine experiment. *Nature*, 563: 59–64.
- Bonnefon, J-F., Shariff, A., Rahwan, I. (2018). The social dilemma of autonomous vehicles. *Science* 352(6293): 1573-157
- Duarte, F., (2019). Self-driving cars: a city perspective. *Science Robotics* 4(28).
- Lipson, H., Kurman, M. (2016). *Driverless: Intelligent cars and the road ahead*. MIT Press

Part 2: Class discussion: AV and urban design

Required Readings

- Duarte, F. & Ratti, C. (2018). The impact of autonomous vehicles on cities: A review. *Journal of Urban Technology*, 25 (4), 3-18.
- NACTO. (2019). *Blueprint for Autonomous Urbanism - Second Edition: revised*. New York: Nacto. Available at: <https://nacto.org/publication/bau2/>

Additional Readings

- Meyboom, A. (2019). *Driverless Urban Futures A Speculative Atlas for Autonomous Vehicles*. London: Routledge.

**** Class exercise 3: Autonomous vehicles: policies and design [pairs]**

Lecture 11: April 23

Part 1: Curb management: multiple spatial and temporal scales of land use and transportation

Required Readings

- NACTO. (2019). *Blueprint for Autonomous Urbanism - Second Edition: revised*. New York: Nacto. Available at: <https://nacto.org/publication/bau2/> (Chapter 3.2: Curbs for Access)

OECD/ITF. (2017). *The Shared-Use City: Managing the Curb*. Paris: OECD/International Transport Forum. Available at:
https://www.itf-oecd.org/sites/default/files/docs/shared-use-city-managing-curb_3.pdf

Part 2: Case Study: RATP, Paris [guest lecturer, Arianna Salazar]

**** Class Exercise 3 due**

MODULE 5: CASE STUDIES / STUDENT PRESENTATION

Lecture 12: April 30

Part 1: Case Studies: technologies (Autonomous Vehicles, Speed Rail, Hyperloop)

Part 2: Case Studies: technologies (AV freight, drones and logistics)

Lecture 13: May 07

Part 1: Case Studies: transit (BRT, TOD)

Part 2: Case Studies: policies and financial instruments

**** Final Assignment due**