

PUBP 714: Transportation in the Information Age

Fall, 2007

Mondays 7:20 -10:00 PM
Arlington Bldg Room 336
GMU-Arlington Campus

Instructor: Tschangho John Kim
Endowed Professor of Urban & Regional Systems
University of Illinois at Urbana-Champaign
tjohnkim@uiuc.edu

Course Overview

The course will examine a number of important issues related to transportation planning and policy in the information age. We begin by taking a close look at the historical changes in the society, development of transportation technologies and changes in demand for mobility focusing on the fundamental question of the role of transportation in dynamically changing social systems. We will continue by examining policy issues and options for alternative transportation systems that would meet demand for future mobility.

Requirements and Grading Policy

Two mid-term essays and a final term paper will be required for the course. The purpose of the essays is to provide opportunities to integrate the principles of the course by analyzing selected technologies that affect transportation demand and supply. The final term paper topic is “Transportation Planning and Policy for Future Cities” and will be due by December 3. In addition, students will be asked to present their papers at the Dec.3 class.

The final grade for the course will be determined by the following criteria:

- Mid-Term Essay 1: 25%
- Mid-Term Essay 2: 25%
- Final Term Paper: 40%
- Class Participation: 10%

I. Technology Evolution

1.1 Technological Changes and Transportation Development: Week 01 (Aug 27), Week 03 (Sept 10)

Selected Readings:

- ♦ Garrison, William L. 2004a, “Historical Transportation Development”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Garrison, William L. 2004b, “Technological Changes and Transportation Development”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Thompson, G.L., 2004, “Transportation Development and Institutional Change”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Kim, T.J, 2002, “Transportation Planning and Engineering”, in *Knowledge for Sustainable Development - An Insight into the Encyclopedia of Life Support Systems*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK. The article is also available in [<http://www.eolss.net>].

Lecture Notes:

- ♦ Week01: New Life for an Old Stream
- ♦ Week03A: Transportation System and Policy Evolution: An Historical Perspective
- ♦ Week03B: Transportation Problems

1.2 Social Changes and Mobility: Week 04 (Sept 17)

- ♦ Stough Roger R. 2004, “Mobility and Social, Technological and Environmental Changes” in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Button, Kenneth, 2004, “Social Change and Demand for Mobility”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]

Lecture Notes:

1.3 Information and Network Society: Week 05 (Sept 24), Week 06 (Oct 1)

- ♦ Barney, D. (2005). *The Network Society*. Cambridge, UK.: Polity Press.
- ♦ Feather, J. (2004). *The Information Society: A Study of Continuity and Change*. London, UK: .Facet Publishing.
- ♦ Malecki, E.J., 2006, "Cities in the Internet Age", in Johansson, B. C. Karlson and R. Stough (eds), *The Emerging Digital Economy*, Springer-Verlag, Berlin.
- ♦ Stimson, Robert J., 2006, "The Digital Divide: A Review of Socio-Economic and Spatial Distribution Issues in ICT", in Johansson, B. C. Karlson and R. Stough (eds), *The Emerging Digital Economy*, Springer-Verlag, Berlin.
- ♦ Sohn, J., Hewings, G. J. D., & Kim, T. J. (2004). Intra-metropolitan agglomeration, information technology and polycentric urban development. In Capello, R. & Nijkamp, P. (Eds.), *Urban Dynamics and Growth*, Amsterdam: Elsevier.
- ♦ Sohn, Jungyul, Tschangho John Kim and Geoffrey Hewings, 2002, "Information Technology Impacts on Urban Spatial Structure in the Chicago Region" in *Geographical Analysis*, Volume 34, Number 4, pp. 313-329.
- ♦ Sohn, J., Kim, T. J., & Hewings, G. J. D. (2005). Information technology and urban spatial structure: a comparative analysis of the Chicago and Seoul regions, In Richardson, H.W. & Bae, C-H. C. (Eds.), *Globalization and urban development*, Heidelberg: Springer.
- ♦ Haenselmann, T. (2006). *Sensor Networks*, GFDL Wireless Sensor Network textbook, Mannheim, Germany: University of Mannheim, Informatik. available at http://www.informatik.uni-mannheim.de/~haensel/sn_book/
- ♦ So, A. T. & Chan, W. L. (1999). *Intelligent Building Systems*. Norwell, MA: Kluwer Academic Publishers.
- ♦ Series of papers about Intelligent Building at <http://www.extra.rdg.ac.uk/ib/Downloads.htm>

Lecture Notes:

1.4 Geographic Information System for Transportation (GIS-T): Week 07 (Oct 8)

- ♦ Miller, Harvey and Shaw, Shih-L. (2001). *Geographic Information Systems for Transportation: Principles and Applications*, Oxford University Press, Oxford, UK.
- ♦ Thill, J.-C. (ed.), (2001) *Geographic Information Systems in Transportation Research*, Elsevier.
- ♦ Jinsoo You and Tschangho John Kim, 2000, "Development and Evaluation of a Hybrid Travel Time Forecasting Model", in *Transportation Research C*. 8: 231-256.

- ♦ James P. Hall, Tschangho John Kim and Michael I. Darter, 2000, “Cost-Benefit Analysis of Geographic Information System Implementation”, in *Transportation Research Record*, Journal of the Transportation Research Board, No. 1719219-232.

Lecture Notes:

1.5 Intelligent Transportation Systems (ITS): Week 08 (Oct 15), Week 09 (Oct 22)

- ♦ Federal Highway Administration (FHWA) ITS Programs, available at http://www.its.dot.gov/modal/modal_fhwa.htm
- ♦ Stough, R. R. and Guang Yang, 2004, “Intelligent Transportation Systems”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Stough, R.R, Mark E. Magio and Dingjian Jin, 2001, “Methodological and Technical Challenges in Regional Development of ITS: Induced and Direct Effects”, in Stough, R.R. (ed.) (2001). *Intelligent Transportation Systems: Cases and Policies*, Cheltenham, England: Edward Elgar Publishing.
- ♦ Maas, G., Mark E. Magio, Hadi Shafie and Roger R. Stough, 2001, “Incident Management and Intelligent Transportation Systems Technology: Estimating Benefits for Northern Virginia”, in Stough, R.R. (ed.) (2001). *Intelligent Transportation Systems: Cases and Policies*, Cheltenham, England: Edward Elgar Publishing.
- ♦ Niles, John S., 2004, “Telecommunications Substitution for Transportation”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Button, Kenneth, Roger R. Stough, Michelle Bragg and Samantha Taylor, 2006, “Telecommunications and Travel Behavior”, in Button, Kenneth, Roger R. Stough, Michelle Bragg and Samantha Taylor (eds), 2006, *Telecommunications, Transportation and Location*, Edward Elgar, Northampton, MA.

Lecture Notes:

1.6 Week 10 (Oct 29): Essay 1: No Class.

Impact of GPS on Mobility: The essay should be 5 pages in length (double space) excluding tables, figures and charts. Some useful references are:

- ♦ *Global Positioning System*, wikipedia.org article, available at http://en.wikipedia.org/wiki/Global_Positioning_System
- ♦ *GPS Tutorial*, Trimble Navigation Limited, available at <http://www.trimble.com/gps/index.shtml>
- ♦ Dana, Peter H. (1994). *Global Positioning System Overview*, "available at http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html
- ♦ Tschangho John Kim, 2004, "GIS/GPS in transportation", *The 2004 McGraw-Hill Yearbook of Science and Technology*, McGraw-Hill, Chicago, 133-135.

Lecture Notes:

II. Mobile Society in Ubiquitous Space

2.1 Location Based Services (LBS): Week 11 (Nov 5)

- ♦ Steiniger, Stefan, Moritz Neun and Alistair Edwardes (2006) *Foundations of Location Based Services*, available at http://www.geo.unizh.ch/publications/cartouche/lbs_lecturenotes_steinigeretal2006.pdf
- ♦ Schiller, J. H., and A. Voisard, (2004) *Location-based services*. Morgan Kaufmann Publishers.
- ♦ Rao, Bharat, and Louis Minakakis, (2003) "Evolution of mobile location-based services," *Communications of the ACM*, Volume 46 , Issue 12, pp.61-65.
- ♦ You, Jinsoo and Tschangho John Kim, 2005, "Toward Developing A Travel Time Forecasting Model for Location-Based Services: A Review", in A. Reggiani and L.A. Schintler (eds), *Methods and Models in Transport and Telecommunications*, Springer, Berlin.
- ♦ Kang, Seungmo, Tschangho John Kim and Sung-Gheel Jang, 2006, "Location-Based Services: Enabling Technologies and a Concierge Service Model", in H. Miller (ed), *Societies and Cities in the Age of Instant Access*, Springer.
- ♦ Kang, Seungmo, Seung Oh, Tschangho John Kim, 2006, "Heuristic Algorithm for Solving a Multimodal Location-Based Concierge Service Problem", *Transportation Research Record: Journal of the Transportation Research Board*, No. 1972, pp 123-132.

Lecture Notes:

2.1 Ubiquitous Computing and Ubiquitous Space: Week 12 (Nov 12)

- ♦ Greenfield, Adam (2006). *Everyware: the dawning age of ubiquitous computing*. New Riders
- ♦ Davies, N., and H.-W. Gellersen, (2002) “Beyond prototypes: challenges in deploying ubiquitous systems,” *Pervasive Computing* 1(1):26-35. available at http://www.ee.oulu.fi/~skidi/teaching/mobile_and_ubiquitous_multimedia_2002/beyond_prototypes_challenges.pdf
- ♦ Abowd, G.D. and E.D. Mynatt, (2000) “ Charting past, present, and future research in ubiquitous computing,” *ACM Transactions on Computer-Human Interaction* 7(1):29-58. available at http://www.ee.oulu.fi/~skidi/teaching/mobile_and_ubiquitous_multimedia_2002/charting_past_present_and_future.pdf
- ♦ Kim, Tschangho John, forthcoming in 2008, “Planning for knowledge cities in ubiquitous technology spaces: opportunities and challenges”, in Yigitcanlar T., Velibeyoglu K. and Baum S. (eds), *Creative urban regions: Harnessing urban technologies to support knowledge city initiatives*, IGI Global (formerly Idea Group Inc.): Hershey, PA (see below for lecture note for a copy-TJK)

Lecture Notes:

2.3 Week 13 (Nov 19): Essay 2: No Class.

Describe the current technology of Radio Frequency Identification (RFID) and its potential implications to your daily life. The essay should be 5 pages in length (double space) excluding tables, figures and charts. Some useful references are:

- ♦ Glover, Bill and Himanshu Bhatt, (2006) *RFID Essentials*, O'Reilly Media
- ♦ Landt, Jeremy, (2001) “Shrouds of Time: The history of RFID,” AIM Inc. available at http://www.aimglobal.org/technologies/rfid/resources/shrouds_of_time.pdf
- ♦ Intermec Technologies Corporation, *RFID Overview*, available at http://epsfiles.intermec.com/eps_files/eps_wp/IntroRFID_wp_web.pdf
- ♦ Karl, H. and A. Willig, (2005) *Protocols and Architectures for Wireless Sensor Networks*, Wiley.
- ♦ Amitay, Einat, Nadav Har'El, Ron Sivan, and Aya Soffer, (2004) “Web-a-Where: Geotagging Web Content,” *Proceedings of the 27th annual international ACM SIGIR conference on Research and development in information retrieval*, Sheffield, UK.

available at <http://delivery.acm.org/10.1145/1010000/1009040/p273-amitay.pdf?key1=1009040&key2=1668670811&coll=GUIDE&dl=GUIDE.&CFID=24302345&CFTOKEN=38722762>

- ♦ Haenselmann, Thomas (2006). *Sensor Networks*, GFDL Wireless Sensor Network textbook. available at http://www.informatik.uni-mannheim.de/~haensel/sn_book/

Lecture Notes:

III. Policy Implications

3.1 Future Cities: Week 14 (Nov 26)

- ♦ Audirac, Ivonne. (2005), “Information Technology and Urban Form: Challenges to Smart Growth,” *International Regional Science Review* 28, 2: 119–145. available at <http://irx.sagepub.com/cgi/reprint/28/2/119>
- ♦ Miller, Harvey. (ed.) (2007) *Society and Cities in the Age of Instant Access*, Springer.
- ♦ Zook, M., Dodge, M., Aoyama, Y., & Townsend, A. (2004). New Digital Geographies: Information, Communication, and Place. In Brunn, S. Cutter, C & Harrington, J. (eds.). *Geography and Technology*. 155-176. Kluwer, available at http://urban.blogs.com/research/files/new_digital_geographies.pdf
- ♦ S.D. Brunn, S.L. Cutter, and J.W. Harrington (eds.), *Geography and Technology*, 123-123. © 2004 Kluwer Academic Publishers. Printed in the Netherlands.
- ♦ Jungyul Sohn, Geoffrey J.D. Hewings and Tschangho John Kim, 2004, “Intra-metropolitan Agglomeration, Information Technology and Polycentric Urban Development”, in Roberta Cappello and Peter Nijkamp (eds), *Contributions to Economic Analysis*, Elsevier, The Netherlands.
- ♦ ISO/TC 211 Ad hoc UBGI Group, *Revised Report from the Ad Hoc Group for Ubiquitous Geographic Information (UBGI)*, ISO/TC 211 N2242. available at <http://www.isotc211.org/protdoc/211n2242/211n2242.pdf>

Lecture Notes:

3.2 Implications to Future Transportation Systems Planning: Week 15 (Dec 3): Students' Presentation

- ♦ Lakshmanan, T.R. and William P. Anderson, 2004, “ Transportation in the 21st Century: Technological Innovation”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Nijkamp, P., Erik Verhoef, Barry Ubbels and Caroline Rodenburg, 2004, “Sustainable Mobility”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Banister, David, 2004, “ Sustainable Transport and Public Policy”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Haynes, Kingsley E., 2004, “ Sustainable Institutions for Transportation Management: Principles and Evolution”, in Kim, Tschangho John (ed), 2004, *Transportation Engineering and Planning, in Encyclopedia of Life Support Systems (EOLSS)*, EOLSS Publishers/UNESCO, Paris, France, Oxford, UK, [<http://www.eolss.net>] or [<http://greenplanet.eolss.net/EolssLogn/default.htm>]
- ♦ Button, Kenneth, Roger R. Stough, Michelle Bragg and Samantha Taylor, 2006, “Telecommunications and the New Geography”, in Button, Kenneth, Roger R. Stough, Michelle Bragg and Samantha Taylor (eds), 2006, *Telecommunications, Transportation and Location*, Edward Elgar, Northampton, MA.
- ♦