***SYLLABUS***  ***SYLLABUS***

*Orf 467*

*Transportation Systems Planning and Analysis v0*

Fall 2017/2018

[Course Description](http://www.princeton.edu/~alaink/Orf467F17/Orf467CourseDescriptionF17.pdf)

[Enrolled Students](http://www.princeton.edu/~alaink/Orf467F17/enrolled-studentsOrf467F17.xls)

# Part 1. Perspective on the Transportation Sector of the Economy: Its Function, Its Players, Its Technologies, Its Policies, Its Information Sources

# Week 0

# Wed Sep 13

Introduction and Survey of Course

Elements of the transportation sector of the economy, the player, the technologies, the information sources **Reading:** [*Smart Driving Car,*](http://smartdrivingcar.com/) [*Street Smart*](https://www.amazon.com/Street-Smart-Rise-Cities-Fall/dp/1610395646/ref%3Dsr_1_1?ie=UTF8&qid=1472481596&sr=8-1&keywords=street+smart+the+rise+of+cities+and+the+fall+of+cars) by Samuel Schwartz [Has Growth in Automobile Use Ended*?*](http://www.princeton.edu/~alaink/Orf467F13/HasGrowthInAutomobileUseEnded_Pace-Pickrel.pdf)[2017 Motor Vehicle Crashes: 1st](https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318) Half

[FATALITY ANALYSIS REPORTING SYSTEM (FARS) ENCYCLOPEDIA National Transportation Statistics:](https://www-fars.nhtsa.dot.gov/QueryTool/querysection/selectyear.aspx)

[Basic background on Transportation in the US](https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/Pocket_Guide_2017_revised.pdf)(Pocket Guide 2017)

[*Travel Monitoring*](http://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm)

[*Highway Statistics Publication Archive*](http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubsarc.cfm)

[*Freight Facts & Figures 2015*](http://www.princeton.edu/~alaink/Orf467F16/FHWA2015FreightFactsF_complete.pdf)

[*Commodity Flow Survey*](https://www.census.gov/econ/cfs/)

[*National Transportation Statistics 2017*](http://www.princeton.edu/~alaink/Orf467F17/NTS_Entire_2017Q2.pdf)

Energy Flow Diagrams: [2016 Energy flow chart](https://flowcharts.llnl.gov/)s[;](https://flowcharts.llnl.gov/) [Total Energy\_wRejected](https://flowcharts.llnl.gov/content/assets/images/energy/us/Energy_US_2016.png) [2016](https://flowcharts.llnl.gov/energy.html)  [ClassicView](http://www.princeton.edu/~alaink/Orf467F13/ClassicViewEnergy_flow_2011_med.png) ; [Energy Consumption](http://www.eia.gov/todayinenergy/detail.cfm?id=26912)

Energy Outlook 2017: [https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383%282017%29.pdf); World Oil Demand & Reserves:[BP Statistical Review of World Energy, June 2](https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf)[017](https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf)

[WTI Crude](http://data.cnbc.com/quotes/%40CL.1)

**Homework 1:** [The Last Drop or StreetSmarts or The coming of autonomous Taxis](http://www.princeton.edu/~alaink/Orf467F17/HW1LastDropOrf467F17.pdf) ; Due Monday, Sep 18 **Class Notes:** [**Week**](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17Lec1.pdf) [**0,**](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16Lec1.pdf)[**Current News**](http://www.princeton.edu/~alaink/Orf467F16/CurrentNews/CurrentNews_091317.pdf)

# Week 1

# Mon Sep 18

Evolution of Urban transportation Technology: From the Omnibus to PRT (Personal Rapid Transit, “Transport System of the Future???”) History of PRT**;** Historical evolution of National Transportation Policy leading to current National Transportation Policy,

**Readings:** [Travel in London](http://www.princeton.edu/~alaink/Orf467F17/travel-in-london-report-9.pdf) ; [PRT@LHR;](http://www.princeton.edu/~alaink/Orf467F11/Orf467F11PRT%40LHR.pdf) [Jerry Schneider’s Source Page,](http://faculty.washington.edu/jbs/itrans/) [PRT@LHR10Conf;](http://www.princeton.edu/~alaink/Orf467F10/PRT%40LHR10_Conf) [Podcar\_Stockholm\_2011;](http://podcarcity.org/index.php?id=2722)

[2GetThere/Masdar;](http://www.2getthere.eu/) Animations: [IndiaPRT](http://orfe.princeton.edu/~alaink/PRT/Movies/DelhiIndiaPRT_Animation.mpg); [Bath](http://orfe.princeton.edu/~alaink/PRT/Movies/ARUP_Bath_station.mp4)[;](http://orfe.princeton.edu/~alaink/PRT_Movies/ARUP_Bath_station.avi) NJ PRT [Academic](http://orfe.princeton.edu/~alaink/NJ_PRT_F10/NJ_PRT_F10FinalReport.pdf) Look,

**Class Notes:** [**History Slides**](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17_Evolution_of_Transport_Technology_2017.pdf)**,** [**Current News**](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_091817.pdf)

[**http://orfe.princeton.edu/~alaink/PRT/Movies/DelhiIndiaPRT\_Animation.mp4**](http://orfe.princeton.edu/~alaink/PRT/Movies/DelhiIndiaPRT_Animation.mp4)

# Mon Sep 18 Precept

Discussion of “Last Drop” and Big Picture view of Transportation in the next 20 years ([be prepared to discuss](http://www.princeton.edu/~alaink/Orf467F17/MobilityChangeby2038Orf467F17.pdf)this link!) **Readings:** ; [Motor Fuel data and the Highway Trust Fund;](http://www.fhwa.dot.gov/policyinformation/motorfueldata.cfm) [State Gasoline Taxes](http://taxfoundation.org/article/state-gasoline-tax-rates-2009-2013)

# Wed Sep 20

autonomousTaxis, Evolution of Crashless Cars

**Readings:** [KPMG Report on Crashless Cars;](http://orfe.princeton.edu/~alaink/SmartDrivingCars/CenterForAutomotiveResearchSelf-DrivingCarsReport.pdf) [Chunka Mui’s Series in Forbes;](http://www.forbes.com/sites/chunkamui/2013/03/01/googles-trillion-dollar-driverless-car-part-5-how-automakers-can-still-win/) [Todd Litman;](http://orfe.princeton.edu/~alaink/SmartDrivingCars/Reports%26Speaches_External/Litman_AutonomousVehicleImplementationPredictions.pdf) [state-wide autonomousTaxi;](http://orfe.princeton.edu/~alaink/NJ_aTaxiOrf467F12/ORF467F12aTaxiFinalReport.pdf) [Transportation in 2038???](http://www.princeton.edu/~alaink/Orf467F17/MobilityChangeby2038Orf467F17.pdf)[,](http://www.princeton.edu/~alaink/Orf467F11/MobilityChangeby2030Orf467F11.pdf)  [*Smart Driving Car*](http://smartdrivingcar.com/) *videos;*

[**Automation Workshop,**](http://www.auvsi.org/avs2014/proceedings) [**1st Princeton SmartDrivingCar Summit May 2016**](https://orfe.princeton.edu/~alaink/SmartDrivingCars/SDC_Summit_2017/)[**;**](http://orfe.princeton.edu/~alaink/SmartDrivingCars/Presentations/PAVE_DARPA_Links2Movies.pptx)[**PAVE\_DARPA\_Story**](http://orfe.princeton.edu/~alaink/SmartDrivingCars/Presentations/PAVE_DARPA_Links2Movies.pptx)

**Class Notes:**[The Case for SmartDrivingCars](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17_TheCaseForSmartDrivingCars.pptx)[;](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16_TheCaseForSmartDrivingCars.pptx)

# Part 2. Planning and Analysis Tools of Transportation Demand and Investment

# Week 2

# Mon Sep 26

Class Discussion on the Future of Transportation Technology, given Transitions that have happened over the past 150 year. Come prepared having looked at HW 2 & Class Notes

**Homework 2:** [How will the Mobility Environment Change by 2038?](http://www.princeton.edu/~alaink/Orf467F17/MobilityChangeby2038Orf467F17.pdf) ; Due Tuesday, Sep 27

**Class Notes:** Slides: [The Case for SmartDrivingCars](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17_TheCaseForSmartDrivingCars.pptx) , [Adam Jonas](http://linkback.morganstanley.com/web/sendlink/webapp/BMServlet?file=e72626n0-3pka-g002-b8c7-005056013600&store=0&d=1&user=ded82hm7bu07c-2&__gda__=1601757194_55d7b23ee93236041c022c4c70eacdf9#0001&ded82hm7bu07c-0&1601757194_c1c3530231514a8ac2e1c78bdf76871f&0011&ded82hm7bu07c-1&1601757194_45a5104d280513428eb57e473a5220c0) Views of Future Mobility & Questions from HW2.

# Precept Tue 27 7:30pm NOTE DAY Change from Monday

Modeling Transportation Systems; Development of a Formal Urban Transportation Planning (UTP) Process & Decision Making: The Central Jersey Transit Study ; Alternatives Analysis: Goals, Objectives, Metropolitan Planning Processes

Discussion of MyCity homework objectives

**Ref.:** [***Class Notes***](http://www.princeton.edu/~alaink/Orf467F17/Class4PlanRegOrf467F17.pdf) **[MyCityTripGeneration](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17MoreMyCityTrip%20Generation.pdf)**

**Background reference:** [NCHRP Synthesis 406 Advanced Practices in Travel Forecasting](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_406.pdf)

Ed Weiner, [***Urban Transportation Planning in the US: An Historical Overview; 5th Edition***](https://ntl.bts.gov/lib/6000/6500/6598/683.pdf)  ;

[Analytical\_Travel\_Forecasting\_NCHRP765](http://www.princeton.edu/~alaink/Orf467F14/AnalyticalTravelForecastingNCHRP765_091314.pdf)

**Homework**  **#2a,b** [My City](http://www.princeton.edu/~alaink/Orf467F17/HW3a%2Cb_MyCityOrf467F17.pdf) Also See: [My City Trip Generation](file:///P%3A%5Cpublic_html%5COrf467F17%5COrf467F17MoreMyCityTrip%20Generation.pdf)

Examples: [MyCityEx1,](http://www.princeton.edu/~alaink/Orf467F05/ExampleCityHWOrf467F04/Arron-DanCityOrf467F04.xls) [MyCityEx2,](http://www.princeton.edu/~alaink/Orf467F05/ExampleCityHWOrf467F04/Kalmbach-BakerCityOrf467F04.xls) [CityOfEden,](http://www.princeton.edu/~alaink/Orf467F09/City%20of%20Eden%20II.xlsx) [CofEReport](http://www.princeton.edu/~alaink/Orf467F09/Eden%20II.doc) [La Ville Report](http://www.princeton.edu/~alaink/Orf467F16/MyCityF16/La%20Ville%20de%20Kornhauser_Final%20Report.docx) [LaVille Data](http://www.princeton.edu/~alaink/Orf467F16/MyCityF16/LaVilleDeKornhauser.xlsx) [MyCitysummaryTableOrf467F16.xlsx](http://www.princeton.edu/~alaink/Orf467F16/MyCityF16/MyCitysummaryTableOrf467F16.xlsx) Due: Mon. Oct 2 & Mon 3 Before Precept.

# Wed Sep 27

Urban Travel & Transportation System Characteristics: Planning Studies and Methods: Travel Demand Surveys,

Data Sources, Intro to Sequential Demand Forecasting Modeling Approaches; Relating the Travel Demand with

Land Use: **Trip generation**; Activity-based demand models

**Ref.:** Cascetta, Ch.4.1- 4.5[New York Met Area Study,](http://www.nymtc.org/BPM/bpmindex.html) (see Notes for links) [Travel Modeling](http://tmip.fhwa.dot.gov/clearinghouse/docs/mvrcm/) [Demand Modeling Notes](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17L5Demandmodeling.ppt)

**Background & Data Reference:** [;LincolnTravelDemandModel SCAG\_Modelling](http://www.princeton.edu/~alaink/Orf467F12/LincolnTravelDemandModel.pdf) [TCRP B-15 Characteristics of Urban Travel](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_73a.pdf) see especially: [Overall Trip Rates;](http://onlinepubs.trb.org/Onlinepubs/tcrp/TCRP_rpt_73c.pdf) Travel Surveys: <http://www.travelsurveymanual.org/>[**Class Notes**](http://www.princeton.edu/~alaink/WWS527aF05/WWS527aF05L9Demandmodeling.pdf) [Simple Demand Modeling](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17L5Demandmodeling.pdf)[,](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16L5Demandmodeling.pdf) [LincolnTripGen](http://www.princeton.edu/~alaink/Orf467F12/LincolnTripGen.pdf) ;

# Week 3

# Mon Oct 2

Relating the Travel Demand with Land Use: **Trip Distribution**

**Ref**.: [The Gravity Model**,**](http://www.princeton.edu/~alaink/Orf467F12/The%20Gravity%20Model.pdf)[Example of Trip Distribution Mode Lincoln NEl](http://www.princeton.edu/~alaink/Orf467F12/LincolnTripDistribution.pdf)  [SCAGT](http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap05.pdf)ripDistribution

[**Class Notes:**](http://www.princeton.edu/~alaink/WWS527aF05/WWS527aF05L9Demandmodeling.pdf)[**Notes**](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17L6TripDistribution.pdf) **Trip distribution** [**Current News**](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_100217.pdf)

**Mon Oct 2 Precept**

Presentation of MyCity Designs and Trip Generations

# Wed Oct 4

Random Utility Theory and the modeling of **Mode Choice**

**Ref.:**  [**Class Notes**](http://www.princeton.edu/~alaink/WWS527aF05/WWS527aF05L9Demandmodeling.pdf) Cascetta, Ch.3 [Class Notes](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17L7ModeSplit.pdf)[,](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16L7ModeSplit.pdf) [ModeChoice,](http://onlinepubs.trb.org/Onlinepubs/nchrp/cd-22/v2chapter5.html) [SCAG\_ModeChoice](http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap06.pdf) [LincolnModeChoice](http://www.princeton.edu/~alaink/Orf467F10/LincolnModeSplit.pdf)

**Homework**  **#4** [Final Report for MyCity](http://www.princeton.edu/~alaink/Orf467F17/HW4MyCityFinalReportOrf467F17.pdf), [**Current News**](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_100417.pdf)

**Week 4**

# Mon Oct 9

**Traffic Assignment** and paths through networks; Network Analysis: Shortest Paths: Label Setting and Label

Correcting, Shortest paths in Real Networks and Essentially Shortest Paths; Dijkstra’s Algorithm **Readings:** [DijkstraApplet;](http://www.dgp.toronto.edu/people/JamesStewart/270/9798s/Laffra/DijkstraApplet.html) [**Another Dijkstra Visualization**](https://www.cs.usfca.edu/~galles/visualization/Dijkstra.html) <http://www.princeton.edu/~alaink/Orf467F17/LincolnTrafficAssignment.pdf>[5](http://www.princeton.edu/~alaink/Orf467F10/LincolnTrafficAssignment.pdf).1-5.3, Magnanti, Ch2, Ch4 ([to be distributed](http://www.princeton.edu/~alaink/Orf467F17/Readings%26AssignmentNetworks.pdf))

**Ref.:** [**Class Notes**](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16L10TrafficAssign.pdf)  [SCAG\_Networks](http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap04.pdf)  [SCAG\_TrafficAssignment](http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap08.pdf)  [LincolnTrafficAssignment](http://www.princeton.edu/~alaink/Orf467F10/LincolnTrafficAssignment.pdf) <http://www.scag.ca.gov/modeling/pdf/MVS03/MVS03_Chap04.pdf> [**Current News**](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_100917.pdf)

# Mon Oct 10 Precept

Oral **Presentations of Progress on MyCity: Work Trip Distribution + …**

[**Comparisons of Orf467F10 My Cities**](http://www.princeton.edu/~alaink/Orf467F09/MyCitysummaryOrf467F09.xlsx)

# Wed Oct 11

**More on: Paths through networks**; Network Analysis: Shortest Paths: Label Setting and Label Correcting, Shortest paths in Real Networks and Essentially Shortest Paths

Label Setting; Dial and Radix Heap Implementations of Dijksta’s; Label Correcting; real world networks and stochastic issues

Network Flow (Transportation Problem); Wardrop’s 1st & 2nd Principles, Assignemnet Techniques and k-shortest paths

**Additional Readings:**[,He, Kornhauser & Ran, “Essentially best routes in dynamic and stochastic networks”,](http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.332.4657&rep=rep1&type=pdf)

[Zhan & Noon, “Shortest Path Algorithm : An Evaluation using Real Road Networks](http://pubsonline.informs.org/doi/pdf/10.1287/trsc.32.1.65) [**Current News**](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_101117.pdf)

**Ref.:**[**Class Notes**](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17L11Networks.pdf)Magnanti [Ch 4, especially 4.5 through 4.9;](http://www.princeton.edu/~alaink/Orf467F13/Readings%26AssignmentNetworks.pdf) [Readings on Networks,](http://www.princeton.edu/~alaink/Orf467F15/Readings%26AssignmentNetworks.pdf) [,](http://www.princeton.edu/~alaink/Orf467F09/MyCitysummaryOrf467F09.xlsx)[**FlowMapExamples**](http://www.princeton.edu/~alaink/Orf467F17/FlowMapExamples%2717.pdf)[;](http://www.princeton.edu/~alaink/Orf467F11/FlowMapExamples.pdf) [**Tharald Fongaard’15 Traffic Flow Display System**](http://depler.no/route-devel/#/)

[Transportation Network Design](http://www.princeton.edu/~alaink/Orf467F15/TransportationNetworkDesign_Mathew.pdf) [;Hunt, Kornhauser, “Assigning Traffic Over Essentially-Least-Cost Paths”](http://trrjournalonline.trb.org/doi/pdf/10.3141/1556-01ttp%3A/trb.metapress.com/content/b6232269383r2638/) [**The transportation Problem**](http://orms.pef.czu.cz/text/transProblem.html)

**Assignment:** [Magnanti:](http://www.princeton.edu/~alaink/Orf467F17/Readings%26AssignmentNetworks.pdf) [2](http://www.princeton.edu/~alaink/Orf467F16/Readings%26AssignmentNetworks.pdf).1, 2.2, 2.3, 2.4, 2.5, 2.30, 2.31, 2.43, 2.44, 2.45, 4.1, 4.14, 4.15 (These are straight forward. Do them with your partners; turn in one solution set per two person pair. Both work on all problems), ***Due Friday, Oct 20.***

# Week 5

**Mon Oct 16**

**More on Networks and Princeton Trip Synthesizer**

## Ref.: [NJ Trip Synthesizer ;](http://www.princeton.edu/~alaink/Orf467F15/NJ_PersonTripSynthesis.pdf) NationWideNetwork: [Links](http://orf467.princeton.edu/NationWideLinksLevel2.lks), [Nodes](NationWideNodesLevel2.nds), [ReadMe](http://orf467.princeton.edu/NationWideLevel2_ReadMe.pdf); [NationwideSythesizedPersonTrips](http://orf467.princeton.edu/NationWideTrips%2717Kyle/) [Current News](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_101617.pdf)

**Monday Oct 16 Precepts**

Oral Presentations of Final Report of MyCity & Discussion about networks

# Wed Oct 18

**More on ..Princeton Trip Synthesizer: Nationwide Synthesizer**

## Ref.: [Current News,](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_101817.pdf)  [The transportation Problem](http://orms.pef.czu.cz/text/transProblem.html) [Transportation Network Design,](http://www.princeton.edu/~alaink/Orf467F15/TransportationNetworkDesign_Mathew.pdf) [NJ Trip Synthesizer](http://www.princeton.edu/~alaink/Orf467F17/SynthesizingDailyPersonTripsWithImpicationsOnRidesharing.pdf) [;](http://www.princeton.edu/~alaink/Orf467F15/NJ_PersonTripSynthesis.pdf) [Tharald’s Trip Display System](http://depler.no/route-devel/#/),

# Week 6

**Mon Oct 23**

More on NJ Trip Synthesizer. Modeling of the ride-sharing potential of aTaxis in NJ and the Nation

**Reference:** [*NJPRT04,*](http://www.princeton.edu/~alaink/Orf467F04/NJ%20PRT%20Final%20Small.pdf) [*NJPRT05,*](http://orfe.princeton.edu/~alaink/PRT05_Orf467F05) [*NJPRT07,*](http://orfe.princeton.edu/~alaink/Papers/PRT_NJ_Orf467F07_FinalReport.pdf) [*NJPRT08*,](http://orfe.princeton.edu/~alaink/Papers/ORF%20467F08PRTSystem.pdf) [*NJPRT09,*](http://orfe.princeton.edu/~alaink/NJ_PRT_F09/NJ_PRT_F09FinalReport.pdf) [*NJPRTF10;*](http://orfe.princeton.edu/~alaink/NJ_PRT_F10/NJ_PRT_F10FinalReport.pdf)

[*SynthesizingIndividualTravelDemandInNJ*](http://www.princeton.edu/~alaink/Orf467F17/SynthesizingDailyPersonTripsWithImpicationsOnRidesharing.pdf)*& the Nation*

[***A National Hybrid Activity/Agent-Based Demand Model to Characterize the Mobility of the United States***](http://orfe.princeton.edu/~alaink/SmartDrivingCars/PDFs/Marocchini_A_NationalHybridActivity-Agent-BasedDemandModel.pdf)**, K. Marocchini, Jan 2017**

[Mufti: TripSynthesizer;](http://www.princeton.edu/~alaink/Orf467F12/NJ_aTaxisOrf467F12/Mufti%20MSE%201st%20Draft.docx)

[http://orfe.princeton.edu/~alaink/NJ\_aTaxiOrf467F14/Orf467F14Disaggreagated\_Pixels\_View.pptx;](http://orfe.princeton.edu/~alaink/NJ_aTaxiOrf467F14/Orf467F14Disaggreagated_Pixels_View.pptx)  [HillWyrough’14SeniorThesis](http://orfe.princeton.edu/~alaink/Theses/SeniorTheses%2714/Draft-Wyrough_NoationalDisaggregateTripSynthesizer.pdf) ; Brownell\_TRB\_2014Paper

**[Current News,](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_102317.pdf)**

**Tue Oct 24 Precept (Precept moved to Wednesday Oct 25 @ 4:30 in Friend 008 )**

## Wed Oct 25

Special Seminar: [Autonomous Vehicles: Good, Bad, Ugly](http://www.princeton.edu/~alaink/Orf467F17/SamSchwartz102517PrincetonU_AV_GoodBadUgly.pdf), Samuel I. Schwartz, President & CEO, Sam Schwartz Transportation Consultants, Author “[*Street Smarts: The Rise of Cities and the Fall of Cars”*](https://www.amazon.com/Street-Smart-Rise-Cities-Fall/dp/1610395646/ref%3Dsr_1_1?ie=UTF8&qid=1472481596&sr=8-1&keywords=street+smart+the+rise+of+cities+and+the+fall+of+cars)

[Comparisons of MyCity 2017](http://www.princeton.edu/~alaink/Orf467F17/MyCity2017/MyCity2017ComparisonTable.xlsx)

@ 4:30pm Friend 008 Special Seminar: Joshua Herbach’08, Waymo Full Self-drivingCar Team “***Update on Waymo’s Full Self-Driving Cars****”*

# Term Break Oct 29 – Nov 5

**Part 3 The Role of H**i**gh Technology in Transportation**

## Week 7

## Mon Nov 6

More on Modeling of Individual Person-trips in NJ and the Nation

SynthesizingDailyPersonTripsWithImpicationsOnRidesharing.pptx

[Pdf version](file:///P%3A%5Cpublic_html%5COrf467F17%5CSynthesizingDailyPersonTripsWithImpicationsOnRidesharing.pdf)

[Disaggregated\_Pixel\_Views in NJ](http://orfe.princeton.edu/~alaink/NJ_aTaxiOrf467F14/Orf467F14Disaggreagated_Pixels_View.pptx)

[Orf467National\_aTaxiPixelGrid](http://www.princeton.edu/~alaink/Orf467F16/FinalProject/Orf467National_aTaxiPixelGrid.pdf)

[Examples\_of\_some \_{Lat,Lon}\_<->\_PixelCoordinates](http://www.princeton.edu/~alaink/Orf467F16/FinalProject/SampleHalfMilePixelCoordinates.xlsx)

[NationWide Trip Data](http://orf467.princeton.edu/NationWideTrips%2717Kyle/)

[Visualization of USA Person Trips](http://www.princeton.edu/~alaink/Orf467F15/NationWide_aTaxi_System/VisualizationUSA_Trips_FongaardPerricone.pdf)

[Current News](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_110617.pdf)

**Ref.:**

[Earth Point: Excel To Kml – Display Excel Files in Google Earth](https://www.earthpoint.us/ExcelToKml.aspx)

[***Driverless: Intelligent Cars and the Road Ahead***  by Hod Lipson and Melba Kurma, MIT Press, 312 pp](https://www.amazon.com/Driverless-Intelligent-Cars-Ahead-Press-ebook/dp/B01K13FURS/ref%3Dtmm_kin_swatch_0?_encoding=UTF8&qid=&sr=)

**Assignment:** [**Homework 6: Ride-Sharing Potential in MyCounties**](http://www.princeton.edu/~alaink/Orf467F17/HW6_RideSharing_MyCounty_Orf467F17.pdf)  Due Wednesday Nov 15, 2017

## Mon Nov 6 7:30-9:00pm Precept

## Wed Nov 8 Lecture

Synthesis of Nationwide Individual PersonTrips: Discuss Final Term Projects

**Ref.:** [List Final Projects Orf467F16](http://www.princeton.edu/~alaink/Orf467F16/FinalProject/ListFinalProjectsOrf467F16.pdf) ; [Final Project Teams and Task Assignment](http://www.princeton.edu/~alaink/Orf467F16/FinalProject/FinalProjectLineupOrf467F16.xlsx)

**Class Notes:** [Current News](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_110817.pdf)

## Week 8

## Mon Nov 13

Analyzing the ride-sharing potential of aTaxis in NJ and the Nation,

**Readings:** [*Interplay\_Between\_Fleet-size,\_LoS and\_EmptyRepositioning*](http://orfe.princeton.edu/~alaink/TRB%2717/Interplay_Between_Fleet-size%2C_LoS%20and_EmptyRepositioning.pdf) S. Zhu & A. Kornhauser

[*A Ridesharing Analysis with a Hitchhiking Modification Applied to Taxi Trips in New York*](http://orfe.princeton.edu/~alaink/Theses/SeniorTheses%2716/Schindele%2716Hitchhicking_Thesis.pdf)A. Schindele’16

[*Quantifying the Potential for Dynamic Ride-Sharing of New York City’s Taxicabs*](http://orfe.princeton.edu/~alaink/Theses/SeniorTheses%2716/Bhat%2716NYC_TaxiRideSharing_Thesis.pdf) S. Bhat’16

[*Analyzing 1.1 Billion NYC Taxi and Uber Trips, with a Vengeance*](http://toddwschneider.com/posts/analyzing-1-1-billion-nyc-taxi-and-uber-trips-with-a-vengeance/) T. Schneider

Nationwide Person Trip DataBase: <http://orf467.princeton.edu/db>

**Class Notes:** [*AVO\_Analysis\_of\_aTaxi\_Trips\_Throughout\_NJ*](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16Kornhauser_AVO_AnalysisThroughoutNJ.pptx)

[Current News](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_111317.pdf)

**Mon Nov 13Precept**

First impressions of Trips originating from you home county from Kyle’s [NationWideTrips’16 Directory](http://orf467.princeton.edu/NationWideTrips%2716/)

Please work on your own. I’m unable to be there.

## Wed Nov 15

More on: Analyzing the ride-sharing potential of aTaxis in NJ and the Nation. Visitors (Dr. Stan Young & Dr.Venu Garikapati)from National Renewable Energy Lab to learn about what you are doing.

**Readings:** [*Initial assessment and modeling framework development for automated mobility districts*](http://www.princeton.edu/~alaink/Orf467F17/Young_NREL_ITSWorldCongress_Stan_etal_2017.pdf/files.princeton.edu/alaink/public_html/Orf467F17/Young_NREL_ITSWorldCongress_Stan_etal_2017.pdf) *&* [*Next Generation Integrated Mobility: Driving Smart Cities*](http://www.princeton.edu/~alaink/Orf467F17/Young_NREL_TSWC17_AMD_Final.pdf)

 **Class**[**Current News**](http://www.princeton.edu/~alaink/Orf467F16/CurrentNews/CurrentNews_111616.pdf)

**Week 9**

## Mon Nov 20

Toward Real-Time Intelligent Transportation Systems (ITS): Advanced Traveler Information Systems (ATIS):

In-vehicle Satellite Navigation: From TravTek to Navigation Based Services; Global Positioning Systems (GPS)

**Readings:** [Demers,A, et al](http://www.princeton.edu/~alaink/Orf467F07/2006%20ASCE%20AATT%20conf%20paper%20id13947%20ghost%20v3.pdf) “Competing With the Ghost of ADVANCE: Experimenting with Real-Time ATIS”, Fontaine, M.D., et al,

511 Traffic<http://www.trafficland.com/>[;Bay Area](http://traffic.511.org/)  [South Florida](http://www.511southflorida.com/) ; [Virginia](http://www.511virginia.org/) [TampaBay](http://www.511tampabay.com/traffic.html) ; [Minnesota](http://www.511mn.org/)   [Traffic.com](http://www.traffic.com/) ; [Real-time ATIS](http://www.princeton.edu/~alaink/Orf467F07/2006%20ASCE%20AATT%20conf%20paper%20id13947%20ghost%20v3.pdf) [http://www.photoenforced.com/us.html;](http://www.photoenforced.com/us.html) **Class** [**Notes**](http://www.princeton.edu/~alaink/Orf467F16/Orf467F16L16RealTimeIssuesInSatNav.ppt) **[Current News](http://www.princeton.edu/~alaink/Orf467F16/CurrentNews/CurrentNews_112116.pdf)**

**Couple things for fun:**

**<http://orfe.princeton.edu/~alaink/Presentations/DinkyFutureFinalAlainAndrew.ppt>**

[**http://orfe.princeton.edu/~alaink/Presentations/OpenBelowGradeDinkyStationConcepts.pdf**](http://orfe.princeton.edu/~alaink/Presentations/OpenBelowGradeDinkyStationConcepts.pdf)

**http://orfe.princeton.edu/~alaink/Presentations/RadicalImprovements3wPRT.pptx**

**Wed Nov 22**

NO CLASS (exam the previous evening);

# Week 10

## Mon Nov 27

Dr. Chenyi Chen \*16 DeepDriving: Application of Deep Learning to Automated Driving

[Fundamentals of Machine Learning](http://www.princeton.edu/~alaink/Orf467F14/Fundamentals%20of%20Everything.pdf) and specific approaches to Computer Vision for Collision Avoidance and

Self-Driving & Introduction to ChenyiChen Automated Driving Simulator

**Ref.:** *C. Chen, et. al.* [*DeepDriving: Learning Affordance for Direct Perception in Autonomous Driving*](http://orfe.princeton.edu/~alaink/SmartDrivingCars/PDFs/DeepDriving_ChenyiChen_ICCV_Sept2015.pdf)

[*Using\_GTAV\_to\_Learn\_Distances\_TRB\_Final*](http://orfe.princeton.edu/~alaink/TRB%2717/Using_GTAV_to_Learn_Distances_TRB_Final.pdf)A. Filipowicz & A. Kornhauser; [Capsule Networks (CapsNets) - Tutorial](https://www.youtube.com/watch?v=pPN8d0E3900); [Computer Vision for Autonomous Vehicles: Problems, Datasets & State-of-the-Art](http://orfe.princeton.edu/~alaink/SmartDrivingCars/PDFs/Jonai_ComputerVisionFOrAutonomousCars_2017.pdf)

**Class Notes:** [Fundamentals of Machine Learning](http://www.princeton.edu/~alaink/Orf467F14/Fundamentals%20of%20Everything.pdf)  &[“](http://www.princeton.edu/~alaink/Orf467F15/Deep%20Driving.pdf)[**Extracting Cognition out of Images**](http://www.princeton.edu/~alaink/Orf467F16/ExtractingCognitionOutOfImages.pptx)”. *Chenyi Chen \*16*

## Tue Nov 28 Precept

[USA\_aTaxi16](http://www.princeton.edu/~alaink/Orf467F15/HW6_ManagingEmpty_aTaxis.pdf) [Empty Vehicle Management Work Session](http://www.princeton.edu/~alaink/Orf467F16/HW6_ManagingEmpty_aTaxis.pdf) Progress report of Final Projects: [Final Project Teams and Task Assignment](http://www.princeton.edu/~alaink/Orf467F16/FinalProject/FinalProjectLineupOrf467F16.xlsx)

**Wed Nov 29**

Empty aTaxi repositioning in your USA County

**Hold over: Look at version2 of OnePixelExample:** [V2\_OnePixelExample\_FinalOriginPixel17031\_17.xlsx](http://www.princeton.edu/~alaink/Orf467F17/V2_OnePixelExample_FinalOriginPixel17031_17.xlsx)

**Class Notes:** [Management of Empty aTaxis](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17Kornhauser_ManagementOfEmpty_aTaxis.pdf)

**Assignment**: [HW7: Initial Investigation of Empty Vehicle Repositioning Needs for Shared aTaxis to serve your county’s intra-county trips.](http://www.princeton.edu/~alaink/Orf467F17/HW7_ManagingEmpty_aTaxis.pdf) [.](http://www.princeton.edu/~alaink/Orf467F15/HW6_ManagingEmpty_aTaxis.pdf)

**Readings:** Shirley Zhu’s Thesis ([Zhu'16MakingTransportationGreat\_Thesis.pdf](http://orfe.princeton.edu/~alaink/Theses/SeniorTheses%2716/Zhu%2716MakingTransportationGreat_Thesis.pdf)) and “[Interplay\_Between\_Fleet-size,\_LoS and\_EmptyRepositioning](http://orfe.princeton.edu/~alaink/TRB%2717/Interplay_Between_Fleet-size%2C_LoS%20and_EmptyRepositioning.pdf)” S. Zhu & A. Kornhauser

## Week 11

**Sunday Dec 3**

## Mon Dec 4

NJ aTaxi Work Session : **Empty aTaxi Management**

**Readings:** [aTaxisFinalProject\_Analysis\_of\_Demand for and Management of USA aTaxi System](http://www.princeton.edu/~alaink/Orf467F14/aTaxisFinalProject_Analysis_of_Ridesharing%26Empty_aTaxiDemand.pdf)

**[Current News](http://www.princeton.edu/~alaink/Orf467F17/CurrentNews/CurrentNews_120417.pdf)**

## Mon Dec 4 Precept 7:30pm Review for exam

## Wed Dec 6

[**Exam**](http://www.princeton.edu/~alaink/Orf467F17/Orf%20467F17Exam.pdf)**:** **Wednesday Dec 6**  1:30- 2:50pm 101 Sherrerd

Exam covering weeks 1-10 [Instructions](http://www.princeton.edu/~alaink/Orf467F15/OldExams/Orf%20467F13Exam_Instructions.pdf)

**Week 12**

**Mon Dec 11**

NJ aTaxi Work Session : **Empty aTaxi Management**

**Class Notes:** [Management of Empty aTaxis](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17Kornhauser_ManagementOfEmpty_aTaxis.pdf)

**Assignment**: [HW7: Initial Investigation of Empty Vehicle Repositioning Needs for Shared aTaxis to serve your county’s intra-county trips.](http://www.princeton.edu/~alaink/Orf467F17/HW7_ManagingEmpty_aTaxis.pdf) [.](http://www.princeton.edu/~alaink/Orf467F15/HW6_ManagingEmpty_aTaxis.pdf)

**Readings:** Shirley Zhu’s Thesis ([Zhu'16MakingTransportationGreat\_Thesis.pdf](http://orfe.princeton.edu/~alaink/Theses/SeniorTheses%2716/Zhu%2716MakingTransportationGreat_Thesis.pdf)) and “[Interplay\_Between\_Fleet-size,\_LoS and\_EmptyRepositioning](http://orfe.princeton.edu/~alaink/TRB%2717/Interplay_Between_Fleet-size%2C_LoS%20and_EmptyRepositioning.pdf)” S. Zhu & A. Kornhauser

**Assignment:**

**Mon Dec 11 Precept**

NJ aTaxi Work Session :[Homework 6](http://www.princeton.edu/~alaink/Orf467F17/HW6_RideSharing_MyCounty_Orf467F17.pdf) & [HW7](http://www.princeton.edu/~alaink/Orf467F17/HW7_ManagingEmpty_aTaxis.pdf) work session

**Assignment**[**:**](http://www.princeton.edu/~alaink/Orf467F15/HW6_ManagingEmpty_aTaxis.pdf)

##  Wed Dec 13

Final Project Planning Session

**Assignment**: Final Project***[Assessment of RideSharing, ‘Last-Mile” and Optimal Empty Vehicle Management of Large Regional aTaxi Operation](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17_FinalProject.pdf)***

**[Reading](http://www.princeton.edu/~alaink/Orf467F17/Orf467F17_FinalProject.pdf)**s:

**Reading Period** 10:00 am - 1:00pm Saturday Jan 13, Final Workshop on Term Project; Lunch will be served. [Schedule](http://www.princeton.edu/~alaink/Orf467F11/Orf467F11FinalProjSched.htm)