

# Sustainable Transportation Networks

Applied Environmental Studies  
ENVS 4202

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Class time- M and Th, 7-8:30 PM  
Location- Learning Commons, Programme  
Room 1



## The Plan.

In this era of unprecedented global transformations, humanity needs to carefully consider how to manage growth in a manner that allows us to maintain a healthy, sustainable, and enjoyable world. As Singapore continues its stupendous growth trajectory, planning is underway to consider how best to manage its growth while avoiding the pitfalls that other nations have unwittingly discovered. Transportation is one area that we can both observe and potentially affect change. In this class, we will consider Singapore's options for Sustainable Transportation Networks, and to keep it at a manageable scale, explore how bicycling might best contribute to the personal transportation landscape.

**This is a project-based course.** Using Singapore as our laboratory, we will be exploring Sustainable Transportation Networks while seeking global perspectives to inform our work. While the country is on a progressive trajectory when it concerns automobile networks with the Certificate of Entitlement, Electronic Road Pricing (ERP), and other pay-to-use systems for managing congestion, environmental sustainability is not the driving ideology. Yet. One potentially viable, environment and health-friendly supplement to the existing transportation networks is cycling. While the Singapore government has been working diligently on increasing the cycling network by 2030, there are other options that might be considered including bicycle recycling programmes for poorer residents and migrants, bike-sharing on university and corporate campuses, or a range of other ideas that have yet to be thought up!

**Learning Outcomes.** By the end of this class, you will have a toolkit to address a complex, poorly-defined, and largely unconstrained question, working with an interdisciplinary team to come up with viable solutions. You will know how to integrate state-of-the-art academic research with up-to-date reports from NGOs and government agencies, as well as the experience of real people to generate a transdisciplinary<sup>1</sup> framework that recognises the value of the various stakeholders involved. We will be formulating workable policy solutions, information campaigns, and the like, which will be a challenge, but evaluating efforts in other locales will help guide our efforts. The skills developed in this class will be transferrable to a wide-variety of complicated, messy, and critical real-world problems that you will inevitably be charged with addressing in the very near future.

**Evaluation.** You will get as much out of this class as you put in. There will be no exams, however there will be occasional written (W) reports, a durable visual product (V) like an infographic poster or video, and oral (O) presentation to the class. One W report and one of the either V or O products will be completed before the semester break, and one of each before classes end. It is the responsibility of the student to choose the topic, as well as the due date. It is highly recommended that these are not put off to the last minute!

2 Occasional Reports (W)	20%
1 Occasional Report (V)	10%
1 Occasional Presentation (O)	10%
Final Report	30%
Final Visual Product	20%
Class Participation	10%

In the schedule below, we have suggested times when you might complete your occasional reports, but do not feel you need to keep to them- if there is something that you are researching and you feel that the entire group would benefit, let us know and we will schedule you in. **But do not wait until the end of the semester when all sorts of things will be piling up!**

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<sup>1</sup> Transdisciplinary is not synonym for interdisciplinary. A key features of this approach is the incorporation of extra-academic knowledge into a complex research question- *Another critical defining characteristic of transdisciplinary research is the inclusion of stakeholders in defining research objectives and strategies in order to better incorporate the diffusion of learning produced by the research. Collaboration between stakeholders is deemed essential – not merely at an academic or disciplinary collaboration level, but through active collaboration with people affected by the research and community-based stakeholders. In such a way, transdisciplinary collaboration becomes uniquely capable of engaging with different ways of knowing the world, generating new knowledge, and helping stakeholders understand and incorporate the results or lessons learned by the research.* (Wickson et al., Transdisciplinary research: characteristics, quandaries and quality, Futures 2006)

**Resources to get you started.** Research will be the foundation of this project. As you are coming into your final year, you are able to use the library, Internet, and other resources available to bring to bear the work that has already been done on this question. Do not re-invent the wheel! So, rather than giving you a comprehensive list of resources, we leave it to you to delve in and find the best material. As you go forth with your research, however, it is highly recommended that you create a shared document with an annotated bibliography so everyone, including your Profs, know where you've been and can see where you might be going. All that said, to get you started, you would be remiss if you didn't start here-

**Walk & Cycle Singapore:** <http://www.walkandcycle.sg/MS/walkandcycle.aspx>  
**Urban Redevelopment Authority:** <https://www.ura.gov.sg/uol/master-plan/View-Master-Plan/master-plan-2014/master-plan/Key-focuses/transport/Transport - post6>  
**Ministry of Transportation:** <http://www.mot.gov.sg/About-MOT/Land-Transport/Cycling/>

Deffeyes, Kenneth S., **Hubbert's Peak: The Impending World Oil Shortage.** Princeton, N.J.: Princeton University Press, 2001.  
Weart, Spencer, **The Discovery of Global Warming.** Cambridge, MA: Harvard University Press, 2008.

**Group discussions.** As this is indeed a college class, we will be basing our work on the research foundation laid by other researchers on the topic. Therefore, once every other week, we will discuss a series of student-curated articles from the natural and/or social scientific literature as well as documents produced by governments, NGOs and the like on a chosen topic of importance. The first of these seminars will be undertaken by Profs Park and McAdoo to demonstrate the scope of the assignment. Subsequent seminar discussions will be led by students. One format might be that in the first brainstorming session, groups are formed based around specific sub-topics. Each group can be responsible for sharing the research they've uncovered during these discussions.

**Academic Integrity.** It is almost impossible to cheat in this project-based undertaking. Almost. As mentioned before, this is a college class, and as you will be building upon the work done by others, it is critical to the discussion that you recognise their work with the proper citations. Failure to do so once will result in you receiving a zero the particular assignment, failure to do so twice may result in you failing the course. This said, as this is indeed a class, there is ample opportunity for learning- honest mistakes are expected, hence tolerated. If you had it all sorted, you wouldn't need us!

## The Schedule:

The first half of the semester is dedicated to defining the challenges we face. To best understand how to effect change, we need to know why we are trying to change in the first place. Along with considering our motivation, we would do well to understand what has been done before us, so we do not completely reinvent the wheel. This will put us in the best position to be agents of change regarding cycling in Singapore, as well as other projects you undertake.

	Topic	Resources
<b>Week 1</b>	<b>Project Scope</b>	
M, 8 Aug	Introduction to the challenges and existing resources	Syllabus
Th, 11 Aug	<b>6 PM Start?</b> Let's go for a ride! To best understand the issues, we will ride from the Yale-NUS Campus to Lau Pa Sat for dinner.	Dress for sweat!
<b>Week 2</b>	<b>Brainstorm</b>	
M, 15 Aug	Seminar discussion lead by your Profs on state-of-the-art research on bicycle transportation. What are the characteristics of a successful bike-friendly city? How were leaders able to affect this change?	The Costs of Sprawl (1974, 1998); City Limits (Worldwatch); Bikesharing (Shaheen, 2010);
Th, 18 Aug	<i>Charette</i> session. Intro to <i>charette</i> process. Begin to discuss options and priorities for the semester. <b>Attendance Mandatory</b>	Lehrer, J., Groupthink, <i>The New Yorker</i> , 30 Jan 2012; Brainstorming Toolkit, Mindtools.com
<b>Week 3</b>	<b>Oil and Climate</b>	
M, 22 Aug	The two entities that threaten transportation sustainability are running out of oil and the creation of an uninhabitable climate. How likely are either of these?	Read Hubbert's Peak, Discovery of Global Warming; CERA, Why Peak Oil Falls Down; IPCC Synthesis Report 2015; TBD
Th, 25 Aug	<b>Student Lead Seminar.</b> Where do we stand with Hubbert? Why are we where we are on the curve?	<b>TBD by class.</b> Please work with your profs to come up with a good reading list.
<b>Week 4</b>	<b>Existing Cycle Networks</b>	
M, 29 Aug and Th, 1 Sept	Many cities in Europe, the US and elsewhere (where!?!?) have invested in cycling infrastructure. Where are they? What are the available resources and limitations? How might they be adapted in Singapore? What has been done in Singapore?	<b>TDB by class</b>  Walk & Cycle Sg; Sg MoT; TBD
<b>Week 5</b>	<b>URA, CLC, MoT, LTA, HDB, NParks, FCL, ETC.</b>	
M, 5 Sept Th, 8 Sept	CLC, URA, FCL or Invited Panel Discussion Existing networks workshop- How might the division of labour work in our team?	
<b>Week 6</b>	<b>The Case for Singapore</b>	
<del>M, 12 Sept</del> Th, 15 Sept	10 minute presentations on adapting existing networks to Singapore Finish presentations, if necessary	This will be one of your "V" or "O" assignments.
<b>Recess Week!</b>	<b>GO RIDING!</b>	

The second half of the semester will be dedicated to getting the job done. We need to work as a single team, and likely via sets of sub-groups that will address specific issues of interest. By the end of the semester, we will have two, perhaps three, durable products- a visual presentation that can be in the format of your choice along with a report generated for the audience that will be best positioned to help you achieve your goals. The third aspirational goal is to have the wheels spinning on implementing your suggestions.

	<b>Topic</b>	<b>Resources</b>
<b>Week 8</b> M, 26 Sept Th, 29 Sept	<b>Deuxième charette</b> Get back into the swing of things by incorporating new perspectives before getting to work on solutions	
<b>Week 9</b> M, 3 Oct Th, 6 Oct	<b>Workshop</b> Research subtopic in detail, generate outline, plan of action	
<b>Week 10</b> M, 10 Oct Th, 13 Oct	<b>Workshop</b> *McAdoo out of town* Get practical. Source material (if necessary), plan budgets	
<b>Week 11</b> M, 17 Oct Th, 20 Oct	<b>Workshop</b> Synthesize. Devise and write up a workable proposal	Updates can be one of your “O” assignments.
<b>Week 12</b> M, 24 Oct Th, 27 Oct	<b>Workshop</b> Write, design graphics, finalise presentations	Consider using a graphic as one of your “V” assignments.
<b>Week 13</b> M, 31 Oct Th, 3 Nov	<b>Final Presentation(s) Practice</b> Exchange reports, critique, bring together into a single document and presentation.	
<b>Week 14</b> M, 7 Nov Th, 10 Nov	<b>Final Presentation(s)</b>	

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