

Meeting Minutes for AHB45 Committee on Traffic Flow Theory and Characteristics

2014 Summer Meeting and Symposium Celebrating 50 Years of Traffic Flow Theory (Portland, OR; August 13, 2014)

Prepared by the Committee Secretary, Soyoung Ahn and Danjue Chen

0. New member announcement: Mr. Soumya Dey and Dr. Zhongren Wang
1. SimSub: suggested topics for the workshop at TRB 2015:
 - a) Simulation in the era of connected vehicle (by Nathan Gartner). FHWA has a strong interest in this topic.
 - b) Simulation for heterogeneous traffic such as bicycles and pedestrians at the city level (by Hani Mahmassani).
 - c) Managed lanes in the context of Autonomous/Connected Vehicles. Consider having a special/podium session on this topic. Michael Zhang volunteered to give a talk on a related topic. Wenlong Jin and Danjue Chen volunteered to help organize the workshop session.
 - d) Simulation of new/innovative intersection and interchange designs (e.g., cross-over) and signal timing (by Tom Rioux).
 - e) Maybe to work together with crowd modeling workshop? Winnie Daamen will update.
2. Research Problem Statements

The Chairman suggested that we need more research statements into NCHRP, UTC, and other funding agencies. We should provide input to Mohammed Hadi.

 - (1) From Rob: There is a need for additional data, besides NGSIM. Other potential data include SHRP2, Connected Vehicle project in Michigan, etc.
 - (2) FHWA funding to develop a simulation manual.
3. Paper Review

Approximately 199 papers were received. Review assignments will begin soon.
4. Greenshields Prize/Awards

Blue ribbon Award: Need a nomination.

Greenshields Prize: Empirical observations of congestion propagation and dynamic partitioning with probe data for large scale systems (TRB Paper No. 14-0816), By Yuxuan Ji, EPFL, Jun Luo, Shenzhen Institutes of Advanced Technology, Nikolas Geroliminis, EPFL.
5. Mid-year Meeting: plans for 2016 and 2018:

- a) Mid-year meeting in 2016 in Australia or in China? To decide by January 2015. An idea is to have the 2016 meeting in US (since ISTTT 21 will be in Kobe, Japan) and have the 2018 meeting outside US. Another idea is to have a joint meeting with the Traffic Signals Committee, ITS Committee, or Freeway Operations Committee. The Freeway Operations Committee and Highway Capacity Committee are having a joint mid-year meeting in Berlin in 2016. We may look into having a joint meeting with them.
- b) There will be a COTA meeting in China in 2015 (announced by Heng Wei), which is close to the time of ISTTT in Kobe, Japan. Contact Heng Wei if interested in attending.
- c) ISTTT 22 in 2017 will be held at Northwestern University in Chicago.

6. Outreach

See Below

7. Triennial Strategic Planning

- a) A draft TSP will be available on the TFTC website.
- b) TFTC should be more involved in Connected/Automated Vehicles initiatives. Perhaps we should organize a subcommittee or participate in other similar subcommittees.
 - a. There is an existing joint subcommittee between the Highway Automation Committee and the ITS Committee. Hani and the Chairman expressed that their focus is different, and we should create our own with the modeling focus. Stephen Mattingly suggested that we have a liaison to that subcommittee and create our own with a different focus.
 - b. We may organize a section at the end of the Autonomous Vehicle Symposium (next symposium in San Francisco in July) - to coordinate with Wenlong.

8. Classic Papers

- a) The Chairman suggested that we group classic papers perhaps by topics and develop an annotated bibliography.
- b) Way to distribute: Monograph or Wiki monograph
 - a. Jorge Laval has had students contribute to a Wiki site for literature review. Danjue Chen will send the link to the Chairman.
 - b. Benn suggested that we retain our own master document and disseminate in the Wiki format to avoid undesirable alterations of the document.
 - c. Students at TU Delft have organized a seminar to present literature reviews of classic papers. Femke will send the materials to the Chairman.
 - d. Hani suggested that we organize a retreat, sponsored by TRB, to brainstorm topics and materials, and produce consensus of classic papers related activities. Volunteers for hosts/organizers: Wenlong, Femke, and the Chairman.

9. Special Report on Traffic Flow Theory

10. Crowd Flow Dynamics, Modeling and Management

11. FHWA Report (by James Sturrock)

- a) DTA: For toolbox version 3, they are dealing with calibration.
- b) Upcoming/ongoing projects: (1) Test beds for ATDM, (2) Trajectory level validation, (3) Pilot sites for L04, L08, and L38, (4) Guidance on data analysis and how that relates to scoping projects and identifying supporting data collection needs, (5) Simulation Manual parallel to HCM.
- c) Suggestions for potential projects: another NGSIM type project, addressing reliability, impact of weather, vehicle-bicycle interactions, etc. Jim (with FHWA) responded that the program has been downsized and the fate of the program is uncertain at this point.

12. TRB Report

- a) The Annual Meeting in 2015 will be held in the Washington, D.C. Convention Center.
- b) There is a highway automation symposium. We can take their survey to provide feedback: <https://www.surveymonkey.com/s/YSJ3WN7>
- c) Papers and presentations are available online through: AMONLINE.TRB.ORG.
- d) Questions/suggestions to TRR editors:
 - a. Is it possible to assign doi numbers early to accepted papers so that they can be cited?
 - b. Is it possible to have electronic TRR papers published in earlier years?
 - c. TFTC would like to invite a publication staff (Javy Awan, Director of Publications) to our committee meeting in January to address a number of questions/suggestions related to TRR publications.

13. Announcements:

14. Other Conferences:

Adjourn

Panel Discussion on Future of Traffic Flow Theory

Panel Members: Nathan Gartner, Hani Mahmassani, Pitu Mirchandani, James Sturrock, Michael Zhang.

Moderator: Robert Bertini (Chairman)

1. From Pitu Mirchandani
 - a. Evolution of topics in the last 50 years: works of Pipes, Newell → Extension to lane changing, MFD, etc. → Advanced traffic management, ITS, safety.
 - b. What is missing: (1) Studies on mixed traffic (e.g., bikes, peds, bullock carts). We need new models for “driver” behavior and vehicle dynamics, traffic management for mixed traffic, and scheduling of vehicles for system optimal. New theories/models are needed, (2) Lane level models (e.g., there may be autonomous vehicle, connected vehicle lanes). The concept of managed lanes indicates that we need to measure, predict, and control at lane level in real time. (3) Education for research. We need to expand to other areas, including optimization, control theory, and data sciences.
2. From Nathan Gartner
 - a. Emphasis on application of traffic flow theory. Thoughts on how does traffic flow theory contribute to improving signal design and using traffic simulation to optimize control. One future direction: simulation on Connected Vehicle (e.g., how to optimize the process to improve performance, refer to his paper for the mid-year meeting).
 - b. Traffic management lacks good professionals. Need to learn from pilot projects such as San Diego integrated corridor management.
3. From Hani Mahmassani
 - a. Heterogeneity (to disseminate our findings to other communities, like Highway engineers, planners).
 - b. Embrace other perspectives such as lane use and big data.
 - c. New experiments such as the pedestrians and bicycles experiment by Amin (historical: GM experiment) to help discover new aspects of theories. Combined experiments with virtual experiments.
 - d. Interact with other disciplines: e.g., (1) traffic culture (cultural factors in behavior, cross-cultural comparisons); (2) traffic is a very complex system. Maybe we need to learn from or compare with the complexity science.
4. From James Sturrock (FHWA)
 - a. Focus of FHWA, TRB and ASSHTO: Reliability; e.g., C10 and L04 (to integrate reliability in simulation).

- b. Next step: Active demand management: (1) how to improve the reliability concepts developed in ICM (integrated corridor management) projects; (2) how to improve driver adaptation and compliance.
 - c. A major challenge: How to handle the data. New ways are needed.
5. Michael Zhang
- a. Era of Connected, Autonomous vehicles; refer back to his keynote talk.
 - b. Universality (e.g., presentation of Amin), global aspects of traffic flow. To understand the nature of the phenomena.

In summary: two directions: small (go to more detail), big (global aspects).

Questions and Comments:

Q1: (by Danjue Chen) Techniques to address big data and to facilitate modeling.

A1:

Pitu Mirchandani: We can use data mining techniques (real-time and off-time data mining). Data management is also important. We need traffic-computer scientists to interpret data reading and management.

Sue Ahn: We need to be aware of the data quality and whether the information told is correct or wrong.

Robert Bertini: We need to learn from the discipline of health care on how they handle big data.

Michael Zhang: It is still an open question. Big data usually refers to unstructured data, but for us, we mainly use structured data.

Q2: (by Rob Bertini): Who should take charge of the clearing house in the era of big data.

A2: No answer yet.

Q3: Comments from Sue Ahn: There is concern for data quality, and we should play a significant role in big data.

Q4: Comments from Ben Coifman: Operating agencies have collected big data, but they do not know the data quality very well. Challenges are there (e.g., image processing), but the problem is how to make it attractive to researchers/funding agencies. Many small problems exist (e.g., definition of capacity) but are not solved yet.

Q5: Comments from Hani Mahmassani: We want to use data for discovery, and we should be open-minded to new findings (e.g., visualization).

Q6: (from Hani Mahmassani to Robert Bertini): What are the insights from other perspectives, e.g., USDOT agencies.

A6: (by Robert Bertini): A big proportion of the staff are program managers without technical background (usually rely on consulting companies). They have very strict constraints for the staff whom they can talk to and have tight timelines to distribute grants and carry out projects. Thus, it is hard for academic institutes to match their timelines. To improve the relationship he set up the university seminar program there (still on-going) and made it clear to the Office of Transportation Policy that research could inform policy. He also tried to make them talk, bring them together, and exchange thoughts (e.g., inviting the Secretary Ray LaHood and his staff to American ITS). Lesson learned: be connected to political people.