TRB ABJ80 Statistical Methods

Linda Ng Boyle, Chair, ABJ80
University of Washington
linda@uw.edu
Tuesday, Jan 10, 2017, 10:15-12:00 pm
Marriott Marquis Ballroom Salon 10
All sessions are led by Linda Boyle unless otherwise noted.

10:15 to 10:20 am  Introductions
10:20 to 10:25 am  Approval of 2016 Meeting Minutes (Bob Scopatz)
10:25 to 10:30 am  Committee Rotation Requirements and Membership
10:30 to 10:40 am  Workshops/Sessions Sponsored and Co-Sponsored by ABJ80 for 2017
10:40 to 10:45 am  TRB Data Contest for 2018 (Spatial Data)
10:45 to 10:55 am  Paper review process, statistics, and identification of issues (Panagiotis Anastasopoulos)
10:55 to 11:05 am  Discussion of Best Paper Award Process and Qualifications (Peter Savolainen) including picture taking.
11:05 to 11:10 am  Website updates (Mazharul Haque [Shimul])
11:10 to 11:20 am  TRB Circular on Analytical Tools for Transportation Researchers and Practitioners
11:20 to 11:30 am (floating): TRB initiatives and Data Section News (Bernardo Kleiner)
11:30 to 11:40 am  Future Committee Activities and Sessions (Linda Boyle, TBD)
11:40 to 11:55 am  TSIG update (Feng Guo)
11:55 to 11:57 am  PICTURE TAKING
11:57 to 12:00 am  Call to Audience/relevant activities of other committees, conferences, etc.
12:00 pm  Adjourn
Agenda

• 10:15 to 10:20 am: Introductions

• 10:20 to 10:25 am: Approval of 2016 Meeting Minutes *(Bob Scopatz)*

• 10:25 to 10:30 am: Committee Rotations
Committee Membership

• Membership rotation
  – Rotate 1/3 of the committee (or 9 members)
  – Appoint new members
  – Chair needs to submit to TRB by Jan 31, 2017
  – If rotation is not completed on time, ALL members will be dropped from TRB mailing list and STOP receiving TRB pubs

• Goal
  – 25 Main members (chair included)
  – 5 additional slots for non-US members
  – 4 additional slots for “young” members (< 35)
  – 2 additional slots for state DOTs
Committee Membership

- 9-year limit for an individual to serve as a committee member (we have 6 to be rotated)
- Balance of disciplines & geographic region
- Appropriate balance of employer types, affiliations
- Appropriate representation of the various modes
- Proper consideration of women and minorities
- No more than one member from any single organization
- No more than two committee membership
Membership Roster

• 28 members (chair included)
  – 6 international members
• 4 “young” members (35 years or younger)
• 2 state DOTs
Membership Expectations

• ACTIVE participation, which includes:
  – Attending committee meetings
  – Paper reviews
  – Chairing and/or being actively involved subcommittees
  – Helping with sessions/workshops
Activities

- Secretary: Bob Scopatz
- Committee Research Coordinators:
- Paper Review Chair: Panos Anastasopoulos
- Best Paper Review: Peter Savolainen (Chair),
- TRB Data Contest: Naveen Eluru
- Triennial Strategic Plan: David Reinke
- Social Media: Mazharul [Shimul] Haque
- Coordination of Future Sessions/Workshops: TBD
- TRB Circular: Danny Xiao
Sponsored Workshops/Sessions

• 10:30 to 10:40 am: Workshops/Sessions Sponsored and co-sponsored by ABJ80 for 2017
Sponsored Workshops/Sessions

1. Are we too comfortable? Changing the culture of transportation research (Tuesday, 6:00 pm)

2. Poster session (Monday, 10:15-noon) (13 posters)

3. Doctoral student research in transportation (Monday, 3:45-5:30 pm), 12 student presentations

4. Workshop: Spatial analysis (Sunday, 9:00-12:30 pm) (49 people attended)
TRB Data Contest

10:30 to 10:40 am:
TRB Data Contest for 2018
2018 TRB Data Contest

• Spatial data for 2018 Data Contest
  – Develop a research question(s)
  – Create or have a data dictionary
  – “Call Center”: someone to answer questions from contestants
  – Data needs to be POSTED before Fall 2017
  – Submissions (with short paper) due November 30, 2017
  – Need reviewer
Paper Review Process

Panos Anastasopoulos

10:45 to 10:55 am: Paper review process, statistics, and identification of issues
2017 ABJ80 Poster Session

- ABJ80 Statistical Methods in Transportation Session (Monday, 1/9/2017)
- 14 papers
- Attendance: 300
2017 Paper Review

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<tr>
<th>Category</th>
<th>Submitted papers</th>
<th>Accepted for presentation</th>
<th>Accepted for publication</th>
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<td>All Papers - 2017</td>
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<tr>
<td>Submitted for presentation only</td>
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2017 Paper Review [cont.]

- **Presentation acceptance rate**
  - 2016 Papers: 59%
  - 2017 Papers: 54%

- **Publication acceptance rate**
  - 2016 Papers: 21%
  - 2017 Papers: 17%
2017 Paper Review [cont.]

- Thank You!
- Reviews for other Committees (about 10 Committees – same as in 2016):
  - Contributed 27 reviewers (53 in 2016) for 22 papers (24 in 2016)
A Cordial Thank You to ABJ80 Reviewers!

<table>
<thead>
<tr>
<th>Bidisha Ghosh</th>
<th>Fred Mannering</th>
<th>Kara Kockelman</th>
<th>Panos Anastasopoulos</th>
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<td>Billy Williams</td>
<td>Gary Davis</td>
<td>Karl Kim</td>
<td>Paul Jovanis</td>
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<td>Birsen Donmez</td>
<td>Ghazan Khan</td>
<td>Konstantina Gkritza</td>
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<td>Bo Lan</td>
<td>Gordon Lovegrove</td>
<td>Kun-Feng Wu</td>
<td>Priyanka Alluri</td>
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<td>Carol Flannagan</td>
<td>Grigorios Fountas</td>
<td>Linda Boyle</td>
<td>Ram Pendyala</td>
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<td>Chandra Bhat</td>
<td>Gudmundur Ulfarsson</td>
<td>Md Tawfiq Sarwar</td>
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<td>Cong Chen</td>
<td>Helai Huang</td>
<td>Md. Mazharul Haque</td>
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<td>Danny Xiao</td>
<td>Jenny Guarino</td>
<td>Michael Pawlovich</td>
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<td>David Reinke</td>
<td>John Ivan</td>
<td>Mohamed Abdel-Aty</td>
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<td>John Milton</td>
<td>Mohammed Quddus</td>
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<td>Eleni Vlahogianni</td>
<td>Jonathan Aguero-Valverde</td>
<td>Mokbul A. Khan</td>
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<td>Feng Guo</td>
<td>Jonathan Wood</td>
<td>Naveen Eluru</td>
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ABJ80 Best Paper Award

Peter Savolainen

10:55 to 11:05 am: Discussion of Best Paper Award Process and Qualifications
ABJ80 Best Paper Award

Best Paper Award Committee (2015, 2016):
– Chair: Peter Savolainen, Iowa State U.
  • Jonathan Aquero-Valverde, Universidad de Costa Rica
  • Bo Lan, UNC

Thank You, Best Paper Award Committee!
ABJ80 Best Paper Award Criteria

• Overall Top Contender
• Novelty of approach
• Contribution to the existing/current body of knowledge
• Potential impact
TRB ABJ80 Statistical Methods

2017 Best Paper Award

Presented to

Shamsunnahar Yasmin, Naveen Eluru, Jaeyoung Lee,
and Mohamed A. Abdel-Aty

Paper Title: An Ordered Fractional Split Approach for Aggregate Injury Severity Modeling
Mazharul [Shimul] Haque

• Website: http://trbstats.weebly.com/
• ABJ80 LinkedIn Site
• Twitter site
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Iowa State University
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Priyanka Alluri
Assistant Professor
Florida International University
Google Scholar Profile

Thomas Jonsson
Professor
Norwegian University of Science and Technology

Young Members:

Yiyi Wang
Assistant Professor
Montana State University
Google Scholar Profile
TRB Circular

11:10 to 11:20 am

TRB Circular on Analytical Tools for Transportation Researchers and Practitioner
Objective: This TRB circular is a compilation of papers based on past EDUCATIONAL workshops sponsored by the Statistical Methods committee (ABJ80). It is intended to provide transportation state agencies, graduate students, and researchers insights on commonly asked statistics questions.

• Each chapter will use the TRB author guide.
• Each chapter will give full acknowledgment to all contributors/co-authors
TRB Circular Outline

1. Handling Missing Data *(Danny Xiao, Gaurav Mehta, Promod)*
2. Sampling Weights *(Mehdi N., Promod, Priyanka)*
4. Bayesian Statistics *(Jonathan A, Gord L, Bo Lan)*
5. Time Series Modeling *(Bidisha, Birsen Donmez, Deo E.)*
6. Traditional Statistics vs Artificial Intelligence *(Naveen Eluru, Ramana Duddu, Anuj Sharma)*
7. Statistical Challenges with Naturalistic Data *(Ken Wu, Paul Jovanis, Feng G., Carol F., Karin B., Mohamed Ahmed)*
8. Spatial *(Yiyi Wang, Ghazan Khan, Matt Volovski, Lise Hensdill)*
   - Appendix can include TRB Data Contest data sets, codes, etc.
   - And relevant textbooks
   - Common Definitions/Glossary
Chapter 1: Handling Missing Data

• Introduction
  – Benefits beyond “deleting”
  – Missing-data patterns (MCAR, MAR, NMAR)

• Methods to deal with missing data
  – Complete case analysis
  – Imputation-based procedures
  – Model-based procedures

• Case Study
  – Traffic data in ITS
  – Pavement performance data

• Summary and Discussion

Draft prepared by Danny Xiao
Chapter 2: Sampling Weights
Chapter 3: Data Quality

- What is Data Quality
  - In the news
  - Dimensions of data quality

- Establishing a Data Quality Improvement Process
  - Data vs Information vs Records
  - Information quality program
  - Practical example from crash reporting in a State

- Data Quality from the Users’ Perspective
  - What do users care about?
  - What about data collectors’ and managers’ needs?
  - Formal, comprehensive data quality management
  - What makes a “good” data quality measurement good?
Chapter 4: Bayesian Statistics

• Introduction
• Principles of Bayesian Inference
• Bayesian and frequentist statistical inference
• Bayesian data analysis
• Examples in transport
• Case Studies (Road Safety, Travel Behavior, Traffic engineering, Pavements, etc.)
Chapter 5: Time-Series Analysis

• Why & when to use Time-Series (TS) analysis?
• Characteristics of TS datasets
• Popular Models for TS analysis & tips for choosing the appropriate models
• Software for TS modelling
• Case Study (Accident analysis, Traffic flow prediction, Air travel demand forecasting etc.)
• What is the Future?... Emerging models

Draft prepared by Bidisha Ghosh
Chapter 6 Tradition Statistics vs. Artificial Intelligence

• Section 1: Traditional methods for statistical Analysis
  – ANOVA
  – Linear Regression
  – Discrete Choice Models
• Section 2: Artificial Intelligence approaches
  – Decision tree Approaches
  – ANN
  – Fuzzy set methods
• Section 3: Case Studies comparing the methods
  – Railway Way-Bill data
  – Distracted Drivers at Yellow Onset
  – Pavement Maintenance

Draft prepared by Naveen Eluru
Chapter 7: Statistical Challenges in the Analysis of Naturalistic Driving Study (NDS) Data

1. An overview of NDS data for traffic safety analyses
   – Data elements, linkage, and event data reduction process
2. Statistical issues in analyzing NDS data
   – Designation of dependent variable and analysis unit
   – Crash surrogate
   – Sensitive data reduction process and its consequences
3. Recommendations/suggestions for NDS data analysis
4. Case Study: SHRP2 NDS Data
Chapter 8. Spatial Analysis

- Motivations for spatial analysis
- Neighborhood structures
- Spatial models
- Applications

In Summary...

- Land use intensities → Ordered probit (OP) models
- Crash counts by severity → MCAR models
- Land use types (or other categorical responses like mode choice) → Spatial multinomial probit (SMNP) models
- Spatial extensions emerge quite naturally from SAR, SEM, & CAR relationships across latent terms (e.g., severities, crash rates, or error terms).
- Estimation is typically achieved using Bayesian methods (but MACML also helpful).
- Useful program packages include R, MATLAB, & WinBUGS.
Agenda

9:20 to 9:30 am (floating)

TRB initiatives and Data Section News (Bernardo Kleiner)
Future Committee Activities/Sessions

11:30 to 11:40 am: Future Committee Activities and Sessions

• Proposed sessions
  – Dealing with small samples
    • e.g., nonparametric, Full Bayes, bootstrapping
  – Quantifying risks associated with increasing vehicle automation (co-sponsor: Safety Section)
  – Data Fusion: How to work with disparate datasets
    • e.g., matching, linking issues

• Beyond 2018?
TSIG updates

11:40 to 11:55 am: Feng Guo

• Joint Statistical Meeting, Baltimore, MD
  July 29-Aug 3, 2016
  – Online abstract submission: Feb 1, 2017, 11:59 pm
  – Online topic-contributed submissions: Jan 11, 2017 (tomorrow!)
  – ABJ80 Mid-year meeting?
Picture Taking

2015

2016
CALL TO AUDIENCE/
OTHER ANNOUNCEMENTS