



DCT Seminar

Convergence of Road Traffic Assignment, Feedback and More!

Professor David Boyce



Professor Emeritus of Transportation and Regional Science
Department of Civil and Materials Engineering
University of Illinois at Chicago
Adjunct Professor of Civil and Environmental Engineering
Northwestern University
Evanston, Illinois

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2:00 pm

University of Delaware, Newark, DE

Center for Composite Materials

Room 106

(This is a free seminar, no registration required)

New results for computational problems related to traffic assignment and solving the sequential travel forecasting procedure with feedback will be presented, including:

- Convergence experiments for road traffic assignment;
- Alternative ways of solving the sequential procedure with feedback;
- A new traffic assignment algorithm that finds consistent route flows, which are the most likely route choices given the user-equilibrium link flows.

The results are illustrated with computational experiments with large-scale network models from practitioner models in the USA.

David Boyce
Department of Civil and Materials Engineering
University of Illinois at Chicago,
Presently Adjunct Professor of Civil and Environmental Engineering
Northwestern University, Evanston, Illinois.

During 40 years of research and teaching, Professor Boyce addressed key methodological issues related to metropolitan transportation and land use planning. His early monograph, *Metropolitan Plan Making*, critically examined the experience with the land use and travel forecasting models during the 1960s. Recognizing that these methods lacked an adequate scientific basis, he has since devoted himself to the formulation and solution of urban travel and land use forecasting models as constrained optimization problems and related constructs, which synthesize elements of network analysis and modeling, stochastic discrete choice theory and entropy-based methods.

Through this research, he concluded that the conventional travel forecasting paradigm, widely known as the four-step travel forecasting procedure, may be seen to be counter-productive. By focusing research on individual elements of daily travel decisions, mainly represented as having fixed travel times and costs, the conventional point of view obscures the overall equilibria and interdependence of travel choices. To offer an alternative perspective, Professor Boyce rigorously formulated, implemented, estimated and validated large-scale, integrated models of travel behavior. This ongoing research offers an alternative both to the conventional viewpoint, and to newer initiatives, which also lack a rigorous scientific foundation. He also extended this integrated approach to the study of regional economies, interregional commodity flows and freight transportation systems. More recently, he has written about the history of these models.

In addition to this primary research theme, from 1986-1996, Professor Boyce was an early innovator of in-vehicle dynamic route guidance systems, a principal element of the emerging field of Intelligent Transportation Systems. This research culminated in his leading a multi-university team that performed development and evaluation tasks for the ADVANCE Project, a large-scale field test of a prototype route guidance system, in conjunction with Motorola, Inc., and federal and state transportation departments. In this role he also conducted theoretical and modeling studies of the performance of route guidance systems on urban road networks.

Following the completion of his Ph.D. in the field of regional science in 1965, in various ways Professor Boyce provided institutional leadership and support to the Regional Science Association International (RSAI) in North America, Europe and Asia. For twenty years, he organized the North American Meetings of this academic society. He served as co-editor of a principal journal in the field of urban and regional research and as associate editor of the archival journal in the transportation research field. In addition, he has served on many editorial boards in regional science and transportation. In 1985, he directed a National Science Foundation workshop on transportation research. In recognition of his research and service contributions to the field of Regional Science, in 2000 he was awarded the Founder's Medal of the RSAI; in 2002, he was elected a

Fellow of the RSAI. In 2000, he received the UIC Inventor of the Year and the UIC College of Engineering Faculty Research Awards for his contributions to transportation modeling and algorithms. He also received the University of Illinois Alumni Association's UIC Flame Award for Teaching Excellence in 2001. In 2003, Professor Boyce received the Robert Herman Lifetime Achievement Award of the Transportation Science and Logistics Section of the Institute for Operations Research and the Management Sciences (INFORMS). He also received the INFORMS Fellows Award in 2003.

During his career, David Boyce served as a tenured faculty member at the University of Pennsylvania (1966-77), the University of Illinois at Urbana-Champaign (1977-88), and the University of Illinois at Chicago (1988-2003). From 1988-1996, he served as Director of the Urban Transportation Center at the last university. Professor Boyce received his B.S. in civil engineering from Northwestern University in 1961, and his Ph.D. in regional science from the University of Pennsylvania in 1965. He also received his Master of City Planning degree from Penn. He is a Registered Professional Engineer in the State of Ohio, a Life Member of ASCE and an Emeritus Member of the Transportation Networks Committee of the Transportation Research Board. To date, he has published 178 journal articles, books, book chapters and reports.

2149 Grey Avenue
Evanston, Illinois 60201
Phone: 847-570-9501
Fax: 775-587-2308
Email: dboyce@uic.edu
d-boyce@northwestern.edu

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