

## Corridors to the Future Transportation and Technology

For the first time in nearly 60 years, attendees of the Transportation Research Board Annual Meeting gathered at a new venue: the Walter E. Washington Convention Center and Marriott Marquis hotel in Washington, D.C. More than 12,200 transportation research practitioners from academia, private industry, government agencies, and more joined their colleagues, January 11–15, 2015.

The new venue served as the stage for more than 5,000 presentations, as well as committee meetings, networking events, award ceremonies, and exhibits. Research topics including vehicle automation, shared-use mobility, and alternative transportation fuels were explored in 25 sessions related to the meeting's theme, "Corridors to the Future: Transportation and Technology."

Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy, University of California, Davis, delivered the 2015 Thomas B. Deen Distinguished Lecture on "The Emerging Transformation of Mobility, Vehicles, and Fuels." Sperling also is the 2015 Chair of the TRB Executive Committee. Robert E. Skinner, Jr., who retired in February after more than two decades as TRB Executive Director,



delivered the Chairman's Luncheon address, after receiving the Frank Turner Medal for Lifetime Achievement in Transportation.

Details and highlights appear on the following pages.

*Annual Meeting photographs by Risdon Photography.*

**1** U.S. Secretary of Transportation Anthony Foxx outlined a 30-year framework for national transportation priorities and policies in a conversation with Washington Post transportation reporter Ashley Halsey III.



**2** Skinner's address at the Chairman's Luncheon, as well as his 21 years of service as TRB Executive Director, drew a standing ovation. In its first year at a new venue, the 2015 Annual Meeting was similarly well-received and enthusiastically applauded.

**3** Abe Lincoln, one of the Washington Nationals' Racing Presidents—whose historical counterpart signed the National Academy of Sciences charter in 1863—led attendees to the Exhibits Hall after the Welcome and Attendee Orientation Session.



**INTERSECTIONS**

**1** Karen White, Office of the Assistant Secretary for Research and Technology, U.S. DOT (*left*), discusses topics of interest in freight transportation with Dinar Karatas, Middle East Technical University.



**2** Alejandro Miramontes (*center*) and Victor Manuel Garcia (*right*), undergraduates at the University of Texas at El Paso, were among the 15 Minority Student Fellows attending the Annual Meeting. Their paper, "Understanding Sources of Variability of Overlay Test Procedure," was selected for publication in the *Transportation Research Record: Journal of the Transportation Research Board*.



**3** The 2015 Technical Activities Council, which oversees the TRB Annual Meeting programs.

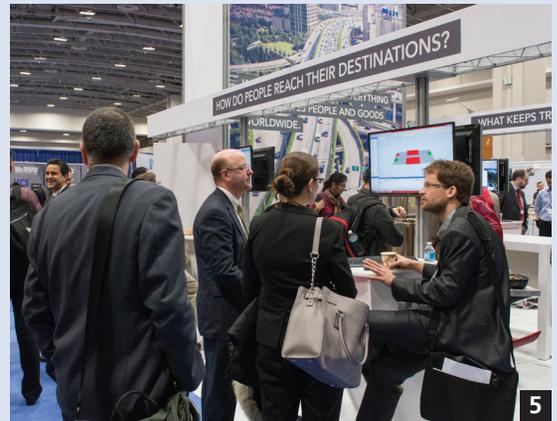


**3** TRB Technical Activities Council (*front row, left to right*): Harold (Skip) Paul, Eric Shen, Council Chair Daniel Turner, Paul Jovanis, and Hyun-A Park; (*back row, left to right*): Mark Norman, D. Stephen Lane, Barbara Ivanov, Ram Pendyala, Peter Briglia, Stephen Popkin, Mary Ellen Eagan, David Wilcock, Georgios Giannopoulos, Alison Conway, and Robert Shea.

**4** (*Left to right*): Don Hunt, Colorado Department of Transportation (DOT); Phillip J. Caruso, Institute of Transportation Engineers; Frederick G. (Bud) Wright, American Association of State Highway and Transportation Officials (AASHTO); Thomas E. Kern, ITS America; Dennis Motiani; and Jeffrey A. Lindley, Federal Highway Administration (FHWA), unveil the National Operations Center of Excellence.



**5** A new venue facilitated the largest Exhibit Hall in TRB Annual Meeting history.



**6** Jamie Holter describes the Greenroads rating system to a meeting attendee in the Exhibit Hall.



**7** Trung Duong, FHWA, examines the robot-assisted, remote-controlled RABIT bridge deck assessment tool in the Exhibit Hall.



**8** Dianne Skinner, the "Hostess of TRB," receives accolades for her more than 20 years of contributions to the Annual Meeting.





## SESSIONS AND WORKSHOPS

**1** Steve Phillips, Conference of European Directors of Roads, presents perspectives on Harnessing Potential Payoff of Research Implementation Across Borders.

**2** Fawn Thompson, FHWA, showcases the research of the Dwight David Eisenhower Transportation Fellowship Program.

**3** Roberta Weisbrod, Worldwide Ferry Safety Association, discusses ferry and passenger boat safety.

**4** Krista Nordback, Portland State University, participates in a session on bicycle and pedestrian data programs.

**5** Attendees set up posters for their presentations.

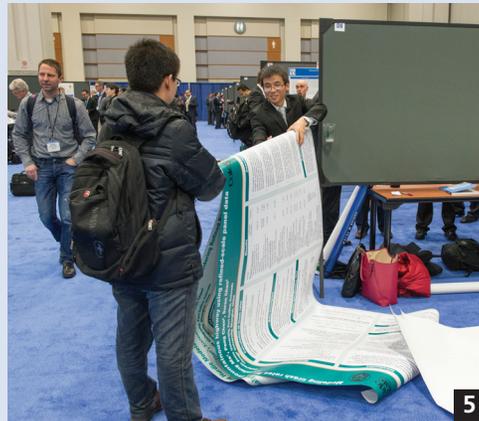
**6** Joseph Coughlin, Massachusetts Institute of Technology (MIT), delivers an address on vehicle automation at the Human Factors Luncheon.

**7** Yi Lin Pei, Cambridge Systematics, examines the Freight Advanced Traveler Information System.

**8** Ghada Gad, Bowling Green State University, guides a session on risk management in construction.

**9** Edward Strocko, FHWA, discusses innovations from the second Strategic Highway Research Program.

**10** Trent Victor, Volvo, examines sustainable mobility and self-driving cars at a Human Factors Workshop.



**11** Nimiforos Stamatiadis, University of Kentucky, leads a session on performance metrics.

**12** (Clockwise from upper left:) Planning and Environment Group Chair Mark Kross with winners of the Eighth Annual Competition and Call for Communicating Concepts with John and Jane Q. Public: Robert Lee; Rick Crawford; Claudia Bilotto; and Annie Nam, Southern California Association of Governments.



**SESSIONS AND WORKSHOPS**

*(continued)*

**1** Greg Nadeau, FHWA, explores innovation at the agency on a panel with other transportation policy leaders.



**2** Atinuke Diver, Volpe National Transportation Systems Center, presides over a session on transportation law, marijuana, and changes in enforcement laws.



**3** Daniel Alzamora, FHWA, discusses geosynthetic reinforced soil-integrated bridge system technology on low-volume roads.

**4** Sandra Tosca, Pennsylvania DOT, presents information on the agency's snow route planning process using geographic information systems.

**5** The economic impact of the elderly ceasing to drive was the subject of research by David Joseph, Morgan State University.



**6** Albert Ferlo, Perkins Cole LLP, shares effective strategies to comply with National Environmental Policy Act transportation-related legislation.

**7** Nicholas Johnson, Virginia Tech, participates in a session on roadway departure risk.

**8** Panelists examine transportation technology trends and revenue capture.

**9** Tyson Rupnow, Louisiana Department of Transportation and Development, speaks about roller-compacted concrete testing.



**10** (Left to right:) Airport Cooperative Research Program (ACRP) graduate award recipients Jeffrey Eloff, Evan Humphries, Jaime Hernandez, Tara Conkling, Paulos Lakew, Sophine Clachar, Maria Vercia, and Leslie McCarthy, with ACRP Senior Program Officer Larry Goldstein.



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## SESSIONS AND WORKSHOPS

(continued)

**1** State Department of Transportation CEO Roundtable, Moving the Goods: Accommodating Major Changes in Freight Flows.

**2** U.S. DOT: Rulemaking for Safety.

**3** Charles Zelle, Minnesota DOT, and TRB Executive Committee member Joan McDonald, New York State DOT, share insights on funding transportation investments in an uncertain federal fiscal environment.

**4** Elizabeth Ogard, Prime Focus, LLC, participates in a question-and-answer session with state DOT CEOs.

**5** Dialogue with Leaders in Design and Construction of Transportation Facilities.

**6** Mark Carr, Channel Design Group, Inc., moderates a session on changing energy sources and multimodal freight systems.

**7** John Carlson, Sundt Construction, discusses the perspectives of the main stakeholders in a construction manager-general contractor project contract.

**8** Debbie Shinstine, University of Wyoming, and Vichika Iragavarapu, Texas A&M Transportation Institute, participate in informal discussions after a panel on Native American tribal transportation issues.



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**1** (Above left, left to right:) Barbara Ivanov, Washington State DOT; Mike Patterson, Oklahoma DOT; and John Cox, Wyoming DOT.

**2** (Above right, left to right:) Therese McMillan, Federal Transit Administration; Michael Huerta, Federal Aviation Administration; and Victor Mendez, Deputy Secretary, U.S. DOT.



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**5** (Left to right:) G. P. Jayaprakash, TRB; Anand Puppala, University of Texas, Arlington; Marshall Thompson, University of Illinois, Urbana-Champaign; Billy Connor, University of Alaska, Fairbanks; and Nancy Whiting, Purdue University.



8

## SESSIONS AND WORKSHOPS

(continued)

**1** Ezra Hauer delivers insights from his latest book, *The Art of Regression Modeling in Road Safety*, to a standing-room-only audience.



**2** Xin Xu, MIT, shares research on use phase and pavement-vehicle interaction in pavement life cycles.



**3** Taylor Czaplewski, South Dakota State University, presents information on field testing for highway bridges.



**4** Gina Capra, Veterans Health Administration Office of Rural Health, participates in a dialogue on veterans' transportation needs.



**5** Panelists discuss bicycle and pedestrian data collection.

**6** Matthew Beck, University of Sydney, Australia, explores methodological advances in travel behavior research.



**7** China's world trade perspective is presented by Yushi Cheng, Shanghai Maritime University.



**8** Mary Karlsson, Metro Transit, addresses public perceptions of managed lane implementation on I-35E in Minnesota.



**9** Transportation resilience was the subject of a presentation by Ali Mostafavi, Florida International University.



**10** (Left to right:) Panelists Michael Manore, Danny Kahler, Deke Smith, and Steven Hagan gather at a workshop on digital project delivery.



**11** Stephanie Blanco, Parsons Transportation Group Inc., explores environmental compliance in California design-build highway projects.



## COMMITTEES

- 1** Susan Sillick, Montana DOT, conducts a meeting of Committee Research Coordinators.
- 2** Jonathan Regehr, University of Manitoba (*right*), shares an idea with the Standing Committee on Highway Traffic Monitoring.
- 3** Paola Bandini, New Mexico State University, guides the Standing Committee on Modeling for the Design, Construction, and Management of Geosystems.
- 4** Debra Brisk, Hennepin County, Minnesota (*left*), receives a certificate of appreciation for chairing the Standing Committee on Construction Management from Section Chair Stuart Anderson.
- 5** Matt Hardy, AASHTO, discusses an upcoming conference with members of the Standing Committee on Transportation Asset Management.
- 6** Rail Group Chair Stephen Popkin (*left*) and Ann Mills (*right*), Chair of the Standing Committee on Railroad Operational Safety, outline committee business.
- 7** Vicki Miller, FHWA (*center*), contributes to the Standing Committee on Statewide Transportation Data and Information Systems.
- 8** Concrete Materials Section Chair Mohammad Khan delivers a report to the Standing Committee on Durability of Concrete.
- 9** The Standing Committee on Transportation Safety Management proceeds through its meeting agenda.
- 10** Chip Millard, FHWA (*right*), and Genevieve Giuliano, University of Southern California, participate in a breakout discussion group of the Standing Committee on Urban Freight Transportation.

## COMMITTEE AWARDS

**1** (Left to right:) Technical Activities Council Chair Daniel Turner with the chairs of the Blue Ribbon committees for 2014: Beverly Kuhn, Active Traffic Management Joint Subcommittee, honorable mention; Eugene Russell, Standing Committee on Roundabouts, for contributing to TRB and the transportation community; Kathryn Zimmerman, Standing Committee on Transportation Asset Management, for advancing research; and Robert Bertini, Standing Committee on Traffic Flow Theory and Characteristics, for community building and mentoring.



**2** Outstanding Young Member Jonathan Regehr, University of Manitoba (center), with Marsha Anderson Bomar, Stantec Consulting, Inc. (left), sponsor of the award, and Young Members Council Chair Alison Conway (right).



**4** Mickle Award winners Kay Fitzpatrick (left) and Marcus Brewer (right), Texas A&M Transportation Institute. Not pictured: Raul Avelar, Texas A&M Transportation Institute.



**3** The K. B. Woods Award for outstanding paper in design in construction went to (left to right:) Walaa Mogawer, University of Massachusetts, Dartmouth; Jo Sias Daniel, University of New Hampshire; and Thomas Bennert, Rutgers University.

**4** The D. Grant Mickle Award recognizes research in operations and maintenance.

## TRB Selects 11 as Emeritus Members of Standing Committees

The following individuals received emeritus membership in TRB technical activities standing committees at the 2015 Annual Meeting, recognizing their significant, long-term contributions, outstanding service, and invaluable participation.

◆ **Michael H. Belzer**, Standing Committee on Trucking Industry Research;

◆ **Paul H. Bingham**, Freight Group;

◆ **Franz Gimmler**, Standing Committee on Emerging and Innovative Public Transport and Technologies;

◆ **Elaine R. Murakami**, Standing Committee on Travel Survey Methods;

◆ **Robert Stephen Newbery**, Standing Committee on

Historic and Archeological Preservation in Transportation;

◆ **C. Paul Scott**, Standing Committee on Utilities;

◆ **Steven Silkunas**, Standing Committee on Intermodal Transfer Facilities;

◆ **John C. Tone**, Standing Committee on Intercity Passenger Rail;

◆ **Rod J. Troutbeck**, Standing Committee on Roadside Safety Design;

◆ **Jeffrey Western**, Standing Committee on Critical Transportation Infrastructure Protection; and

◆ **John D. Wilkins**, Standing Committee on Light Rail Transit.



**5** Several emeritus members of standing committees gather with 2015 TRB Executive Committee Chair Daniel Sperling (right) at the Chairman's Luncheon.



## PAPER AWARDS (continued)

**1** Wootan Award winners (*left to right:*) Adjo Amekudzi-Kennedy, Janille Smith-Colin, Jamie Montague Fischer, and Margaret-Avis Akofio-Sowah, Georgia Institute of Technology.

**3** Waller Award winners (*left to right:*) Dongxi Zheng, Madhav Chitturi, David Noyce, and Andrea Bill, University of Wisconsin, Madison.



**1** The Charley V. Wootan Award is presented for the outstanding paper on policy and organization.

**2** Otto Anker Nielsen (*left*) and Thomas Kjær Rasmussen, Technical University of Denmark, receive the Pyke Johnson Award for planning and environment research.

**3** A paper on secondary crash identification on a large-scale highway system received the Patricia F. Waller Award.

**4** The William W. Millar Award recognizes the outstanding paper on public transportation.

**5** Turner (*left*) presents the John C. Vance Award for a publication of distinction in transportation law to Larry W. Thomas (*right*).



**6** The Fred Burggraf Award for papers by young researchers on planning and environment recognized (*left to right:*) Shoupeng Tang and Tarun Rambha, University of Texas (UT), Austin; Avinash Unnikrishnan, West Virginia University; and Stephen Boyles, UT Austin. Not pictured: Reese Hatridge, UT Austin.



**4** William Millar, former president of the American Public Transportation Association (*right*), joins Millar Award recipients (*left to right:*) David King, Amer Shalaby, and Siva Srikukenthiran, University of Toronto, Canada.



**7** Matt Kroneberger, Metropolitan Washington Council of Governments, receives the Burggraf Award for outstanding paper on the subject of safety and systems users. Not pictured: Nicolae Duduta, EMBARQ World Resources Institute, and Qianqian Zhang, MIT.

**MAJOR AWARDS**

**1** Former TRB Executive Director Thomas B. Deen (*right*) with Deen Distinguished Lecturer Dan Sperling, University of California, Davis.



**2** Katherine Turnbull, TTI, receives the W. N. Carey, Jr., Distinguished Service Award.



**3** 2014 TRB Executive Committee Chair Kirk Steudle (*left*) presents Forrest M. Council, University of North Carolina Highway Safety Research Center (*right*), with the Roy W. Crum Distinguished Service Award.



**4** Steudle reviews the year's highlights at the Chairman's Luncheon.



**5** Robert E. Skinner, Jr., then-TRB Executive Director, receives the Frank Turner Medal for Lifetime Achievement in Transportation, from Bud Wright, AASHTO Executive Director; the medal is awarded biennially.



Policy session speakers included (*left to right*):

**6** Carson Farmer, Center for Advanced Research of Spatial Information and the City University of New York;

**7** Irving Wladawsky-Berger, MIT, Imperial College Business School, and New York University;

**8** Jack Dangermond, ESRI; and

**9** Executive Committee rapporteur Stewart Fotheringham, Arizona State University.

**6-9** Big data was the topic for guest speakers at the Executive Committee Policy Session.



**10** Neil Pedersen, then-TRB Executive Director designate, reports to the Executive Committee on SHRP 2 implementation.



**11** James Crites, Dallas-Fort Worth International Airport, is 2015 Vice Chair of the TRB Executive Committee.



**12** Victoria Arroyo, Georgetown University, was appointed to a new term on the Executive Committee.



# New Leaders Guide Executive Committee

**D**aniel Sperling, Professor of Civil Engineering and Environmental Science and Policy, University of California (UC), Davis, is 2015 Chair of the TRB Executive Committee. He succeeds Kirk Steudle, Director, Michigan Department of Transportation. James Crites, Executive Vice President, Operations Division, Dallas–Fort Worth International Airport, is the 2015 Vice Chair.

An authority on transportation technology assessment, energy and the environmental aspects of transportation, and transportation policy, Sperling is the founding director of the Institute of Transportation Studies at UC Davis. His policy expertise and research on efficient transportation systems have received many accolades, including the 2013 Blue Planet Prize and an appointment to the California Air Resources Board. He has served on many TRB standing committees and more than one dozen National Research Council (NRC) committees. Sperling also is a National Associate of NRC.

A graduate of Cornell University, Sperling received a Ph.D. in transportation engineering from UC Berkeley. He has written more than 200 technical papers and 12 books, including *Two Billion Cars* and *Driving Climate Change: Cutting Carbon from Transportation*.

Crites oversees many divisions at Dallas–Fort Worth International Airport, from asset management to public safety to environmental affairs. After working in key management positions at American Air-



Sperling

lines, he joined the airport in 1995 as director of planning and marketing research. His leadership in facilities development planning and business opportunities assessment was fundamental to DFW's Airport Development Plan. Crites received a bachelor's degree in business administration from the University of Illinois and a master's in operations research from the Naval Postgraduate School in Monterey, California.

Geraldine Knatz, University of Southern California, is a new member of the Executive Committee; she is a past Chair of the Marine Board. Reappointed members include Victoria Arroyo, Georgetown University; Sandra Rosenbloom, University of Texas, Austin; Chris Hendrickson, Carnegie Mellon University; and Henry (Gerry) Schwartz, consultant.

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2014 and 2015 Executive Committee Chairs Kirk Steudle (right) and Dan Sperling (left).

## EXECUTIVE COMMITTEE (continued)

Also appointed to new terms on the Executive Committee were (left to right:)

- 1** Chris Hendrickson, Carnegie Mellon University;
- 2** Geraldine Knatz, University of Southern California;
- 3** Past Executive Committee Chair Sandra Rosenbloom, UT Austin; and
- 4** Henry (Gerry) Schwartz.



**EXECUTIVE COMMITTEE**

(continued)

- 1** Skinner reports to his final Executive Committee meeting as TRB Executive Director.
- 2** Sperling discusses the TRB strategic plan.

Also participating in Executive Committee deliberations were

- 3** Michael Hancock, Kentucky Transportation Cabinet;
- 4** Alison Conway, City College of New York;
- 5** John Gray, Association of American Railroads;
- 6** Donald Osterberg, Schneider National, Inc.;
- 7** William Bronrott, Federal Motor Carrier Safety Administration;
- 8** Gary Thomas, Dallas Area Rapid Transit;
- 9** Gregory Winfree, Assistant Secretary for Research and Technology, U.S. DOT;
- 10** Scott Bennett, Arkansas State Highway and Transportation Department;
- 11** Michael Rodriguez, Maritime Administration;
- 12** Phillip Washington, then with Denver Regional Transportation District;
- 13** Barry Wallerstein, South Coast Air Quality Management District; and
- 14** Jeff Holt, Bank of Montreal.



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## CHAIRMAN'S LUNCHEON ADDRESS 2015

# Research and Innovation in Transportation

ROBERT E. SKINNER, JR.



PHOTOS: REBON PHOTOGRAPHY

The author served as TRB Executive Director for 21 years, overseeing dramatic growth in the size and scope of the Board's activities; he retired at the end of January 2015. His 32 years at TRB also included directorship of the policy studies unit. At the TRB 94th Annual Meeting, Skinner received the Frank Turner Medal for Lifetime Achievement in Transportation. The accompanying article is excerpted from his address at the Chairman's Luncheon, January 14, 2015.

It is a special honor, as I close out my career at the Transportation Research Board (TRB), to talk with you in this forum about an appropriate topic, given the organization's name and this meeting. Nevertheless, the topic is seldom dealt with directly in a TRB luncheon address—namely, research and innovation in transportation.

Usually the speakers deal with the issue of the day in transportation, sometimes with the history or the specific challenges facing a particular mode or agency. But from time to time, we should talk here about research and the pursuit of innovation in our field. This has been topic number one for me for many years.

## Research and Innovation Process

After working at TRB for so long, it would be nearly impossible for me not to have some views about research and innovation. I am especially grateful for the Federal Highway Administration's (FHWA's) support of a continuing committee that has provided advice about the agency's research and technology programs for more than 20 years. Former FHWA Administrator Thomas D. Larson and my predecessor Thomas B. Deen share the credit for establishing this committee.

The members of the Research and Technology Coordinating Committee—through many rotations now—have helped me to shape and organize my

thoughts about transportation research and to relate my thinking more broadly to theories of innovation. The main themes, in retrospect, seem like common sense—but an enlightened common sense that only becomes clear after grappling with the issues for a while.

By and large, the managers of research and technology programs have no formal training in research management but learn on the job. Therefore these insights need to be passed on to avoid wasteful periods of getting up to speed.

Let me offer three illustrations of this common sense.

### Research Is the Beginning

First, research is part of the innovation process, but for many, research, research and development (R&D), and research, development, and technology are code words for promoting innovation. The results of research only achieve value through use, by making something better, less costly, or the like. In its various dimensions—basic, advanced, short-, or long-term—research is part of the innovation process, and in some contexts—transportation is often one—research is the beginning, and maybe the easier and less costly step, of getting a new product, material, or process into common use.

Other steps—development, testing, piloting, revising standards and specifications, training, and



PHOTO COURTESY OF FLORIDA DOT

Self-propelled modular transporters move a bridge span into place within minutes. The results of research achieve value through use, by saving costs, time, and resources.

evangelism—are important in the innovation process. Research by itself seldom leads to innovation; but innovation does not necessarily involve research, at least not formal research.

### ***One Size Does Not Fit All***

Second, the innovation process is not linear. Talking about the innovation process as though it is linear may be convenient sometimes, to present a well-defined set of steps that begin with an idea and then progress from basic research to application. In reality, the process is messy, with interdependencies, iterations, and necessary variations in emphasis, because each innovation faces different technical challenges and operates in different contexts for implementation.

An important implication is that the process for delivering innovation to state and local transportation agencies differs markedly from the one that information technology firms use in developing consumer products or from the process suited to the needs of the Department of Defense. When it comes to innovation, one size definitely does not fit all.

### ***The Scope Is Diverse***

The third illustration concerns the scope of transportation research. Transportation is about moving goods and people and providing choices. Transportation involves engineered stuff, and much of the research is rooted in physical sciences and engineering.

But planning and operating transportation systems require knowledge of human behavior; therefore we need researchers trained in the behavioral and social sciences. In addition, transportation's connection with the natural environment introduces the need for researchers with backgrounds in the natural sciences—and so on.

In short, transportation research is inherently multidisciplinary and incredibly diverse. The pressure to expand the scope of transportation research is virtually inexorable as we gain understanding of the connections to economic, social, and environmental goals and as we seek to exploit new scientific discoveries and technologies from other fields.

For TRB, a continuing challenge is to involve this expanding list of stakeholders, researchers, and practitioners in interactions with transportation practitioners and with the researchers already engaged with TRB. We owe a debt to the founders of TRB—who were mostly engineers—for choosing to organize the Board around an unbounded set of technologies and problems instead of disciplines. This founding principle has allowed an almost seamless evolution into the multidisciplinary organization of today.

## **Nontechnical Challenges**

Some of the other challenges in transportation research are not technical but involve explaining and organizing transportation research.

### ***Complexity of the Endeavor***

The first challenge is complexity. The complexity of transportation research per dollar must be among the highest of any field—that is, the complexity is high in relation to the scale of the program. Transportation is a large, highly decentralized public-private enterprise, and therefore research activities are far less centralized than those of defense research, for example.

Tens of thousands of U.S. counties, towns, and cities—as well as the states—own and operate highways. As a result, the nation's highway research effort is decentralized, and the state departments of transportation (DOTs), individually and collectively, play an important role, along with FHWA, private industry, universities, and other research organizations.

Some duplication and some less-than-optimal coordination are the prices for having a decentralized program that has the buy-in from system operators—those who implement the research products. Understanding and accepting this takes some time. We need not apologize for the complexity, but we must be ready to explain it.

### ***Demonstrating the Value***

Another challenge concerns demonstrating the value of research. Transportation researchers and program managers share this challenge with most everyone engaged in research. We all understand the difficulty of measuring the benefits, of linking changes in practice to specific research efforts, and of dealing with the time scales involved. Nevertheless, we must

With the operation of the nation's highways falling not just to the federal government but also to state and local agencies, highway research must involve collaboration.



PHOTO: DOUG KERR, FLICKR

monitor and measure the effects of research investments systematically.

Beyond that, we should not lose sight of the big picture, which I would liken to a glass that is more than half full yet defies easy quantification. Despite the many barriers to innovation and modest research investments—sometimes with strings and earmarks attached, particularly in the public sector—remarkable gains have been made in practice.

To a casual observer, a new section of an Interstate highway may look the same as one constructed in 1960—but it is not. Almost everything about the planning, design, construction, operation, and maintenance of highways today has changed for the better. Paving materials, roadside safety, real-time traveler information, operations, construction equipment—almost any nameable aspect—all have improved, often because of innovations devised through research.

The same is true for public transportation systems, aviation and airport systems, and private railroads—they deliver better, more efficient services than they did 30 years ago because of the accumulation of innovations, small and large. Sometimes the changes have happened in obvious ways, such as those in vehicle technology, but often the changes are not obvious, such as those from innovations in planning, operations, and finance. Nonetheless, the changes have continued while the systems have dealt with new challenges, such as security and changing travel patterns.

### Securing Funds

Demonstrating the value of past research, of course, relates to the challenge of securing funds for transportation research. That the federal government should support basic research, defense-related research, and health-related research is widely accepted, and the government has provided support in significant ways since World War II.

Less well known is the critical role that the federal government plays in funding research related to publicly provided infrastructure. This is the primary source of funds for transportation. For many years, I have observed closely how Congress has dealt with transportation research in an environment of perpetually scarce resources and competing priorities, and I view federal support as fragile.

Every surface transportation authorizing bill after the Intermodal Surface Transportation Efficiency Act of 1991 has contained some unexpected and unpleasant morning-after surprises for research. Research loses out when funds are needed to make the donor–donee balance work out or when a new construction program is needed. At the negotiation table, research is probably no one’s priority.



1970 MAP PHOTO: DAVEGOTO, FLICKR

Map of Cowlitz County, Washington State, highways in 1970, inlaid with a current online version. New technology and other innovations in recent decades have improved highway design, operations, maintenance, planning, and information.

The only thing we can do about this is to demonstrate the value of research and to rely on those who can take on the advocacy role. Federal support for transportation research has been and continues to be absolutely crucial, but nonetheless I would be more comfortable if state and local transportation agencies—including regional transit agencies and toll road and airport authorities—provided greater support for research with their own funds and depended less on the federal government.

### Programming Research Funding

But suppose that money was not a problem. What if we had a generously funded program with no strings attached and a clean slate? How should those funds be invested among all of the possible topic areas and among the stages in the innovation process? No easy answer and certainly no optimal strategy arise. Simply having across-the-board increases for each topic area and each stage in the innovation process would be a cop-out.

In a recent editorial in *TR News* (1), I argued that we should be guided by four considerations in programming research funding:

Stakeholders in the Cooperative Research Program choose a slate of projects at the yearly meeting of the American Association of State Highway and Transportation Officials Standing Committee on Research.



Richard Capka, FHWA; John C. Horsley, AASHTO; and Ralph J. Cicerone, National Academy of Sciences, signed a Memorandum of Understanding for the second Strategic Highway Research Program in 2006. TRB benefits from its institutional base and works closely with federal, state, and other partners to stimulate and manage applied research.

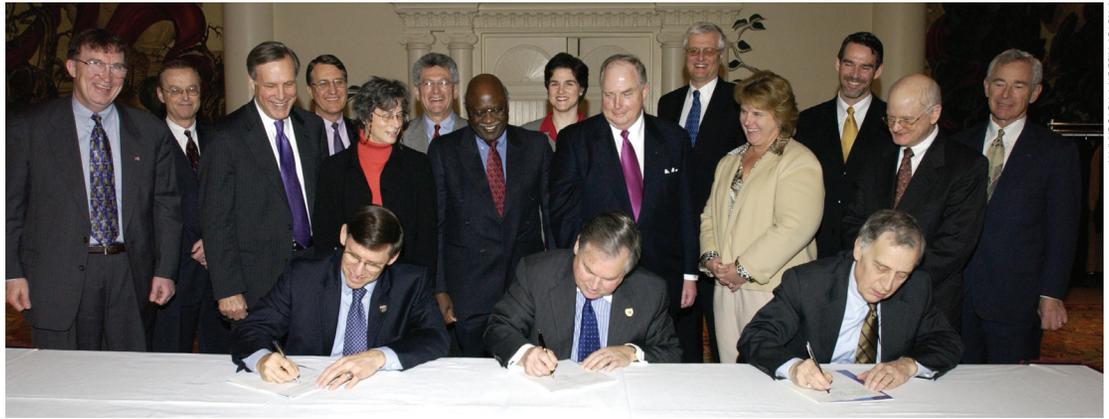


PHOTO: RISSON PHOTOGRAPHY

1. Alignment with agency goals, plans, and needs.
2. Context, which includes such things as the type and scale of the organization, available funding, research capabilities, presence or absence of complementary research programs, and connections with other organizations.
3. Balance across topic areas and steps in the innovation process. No single agency can excel or have the capacity to do it all, but balance is desirable. Therefore funding must be considered based on the subject agency's research program and on the R&D activities under way elsewhere.
4. Stakeholder involvement and engagement. How decisions are made is important, and involving stakeholders—users and other affected groups—in a meaningful way not only provides input for selecting priorities but also helps build the relationships needed for implementation.

## TRB's Unique Role

TRB plays a unique role in transportation research and is a unique organization. Transportation professionals often observe that the Board could never be created from scratch today—this is probably true; and professionals from other fields often wish that such an organization had been created in theirs.



PHOTO: RISSON PHOTOGRAPHY

## Empowerment and Community

A large part of TRB's success comes about through empowerment and community building. TRB provides a forum, a place for professionals to meet, organize, build on each other's endeavors, and to help shape the direction of their particular technical areas.

A good amount of informal coordination takes place among researchers, and informal coordination often is the best kind. Informal coordination is a grass-roots process; in my experience, top-down tinkering with TRB's technical standing committee structure must be done with caution—why mess up a good thing?

TRB's cooperative research programs also are about empowerment—giving the owners and operators of state and local transportation facilities their own national research programs to work on common problems from their own perspective. My firsthand observation is that the engagement level among a committee of stakeholders is much greater when they are making actual programming decisions than when they are merely advising an agency about priorities.

## Sponsor Support

As noted, the TRB founders were remarkably farsighted in how they organized the Board, but credit also must go to the Board's founding sponsor, the Bureau of Public Roads—today's FHWA; to the state DOTs that have been the principal sponsors with FHWA since the late 1940s; and to the sponsors from other modes and related organizations that joined in after the Board officially became multimodal in 1976—they believed the Board truly could become a transportation organization.

Justifying research is difficult, but think about the skepticism that can accompany the decision to fund, year after year, a research organization that does no research itself. TRB is indebted to the literally thousands of agency heads and research program managers who have supported the Board throughout its 95-year history.

### Volunteer Participants

The Board could not exist without sponsors nor without the individual researchers and practitioners who join committees and panels and participate in activities. Drawn from public agencies, the private sector, and academia, tens of thousands of individuals have supported TRB in this way over the years; nearly 8,000 are currently active.

Today's volunteer participants are far more diverse than their predecessors in almost every way—in demographics, disciplines, and perspectives—and TRB and transportation are better for it. It is a great bargain: TRB provides forums for participants to promote their ideas and to help build their careers, and they provide the energy and collective action that helps advance good ideas into practice.

### Institutional Home

Finally, another important ingredient to TRB's success—for which the founders again get credit—was the housing of the Board within the National Research Council (NRC) of the National Academy of Sciences (NAS). This was a wise decision. The Academies, which now include the National Academy of Engineering and the Institute of Medicine, have provided an institutional home characterized by

- ◆ Meticulous attention to quality,
- ◆ A well-deserved reputation for independence and credibility,
- ◆ Access to units with complementary technical expertise, and
- ◆ A special relationship with the federal government, starting with a congressional charter and including periodic endorsements through Executive Orders.

In the early 1980s, NAS prodded TRB to start undertaking policy work like that of the other NRC units. This work initially attracted me to the TRB staff, but more importantly, policy studies have proved a boon for TRB and a valuable service to the nation.

A growing number of policy issues in transportation involve questions of science and technology, and a dwindling number of organizations are making independent assessments of these issues. Therefore I expect that TRB's policy study assignments will take on added importance, as willing sponsors emerge for this important work.

### Continuing Evolution

TRB will continue its unique role in transportation for years to come. The fundamentals will stay the same, but TRB will continue to evolve. The diversity



of participants is increasing, along with the accompanying benefits, but TRB has not finished growing the tent—either in terms of the participants or of the issues they tackle.

Freight, environmental issues, and multimodal planning have been at the forefront in the past 20 years, but new issues will emerge, and new approaches for enduring challenges will be developed. TRB's impact has widened with the adoption of webinars, teleconferences, online publications, and web-based search tools. Continued evolution in these areas will be crucial.

Nevertheless, the goal is not growing TRB but helping researchers and their colleagues deliver better services to transportation system users and to other stakeholders. I am truly thankful for the opportunity I have had to assist in this process during my time at the Transportation Research Board.

### Reference

1. Skinner, R. E., Jr. A Note About Programming Research Funding. *TR News*, No. 292, May–June 2014, pp. 31–35.

TRB's Division of Studies and Special Programs fulfills high-profile policy studies and congressionally mandated research, such as the Review of U.S. DOT Truck Size and Weight Study, at the request of Congress, federal agencies, and other sponsors.

Skinner responds to a standing ovation after receiving the Frank Turner Medal for Lifetime Achievement in Transportation for his more than 30 years of service to TRB.



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