

This PDF is available at <http://nap.nationalacademies.org/26457>



Transportation Research Board 2021 Annual Report (2022)

DETAILS

40 pages | 8.5 x 11 | PAPERBACK

ISBN 978-0-309-08780-3 | DOI 10.17226/26457

CONTRIBUTORS

Executive Office; Transportation Research Board; National Academies of Sciences, Engineering, and Medicine

BUY THIS BOOK

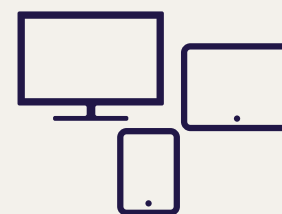
FIND RELATED TITLES

SUGGESTED CITATION

National Academies of Sciences, Engineering, and Medicine 2022. *Transportation Research Board 2021 Annual Report*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26457>.

Visit the National Academies Press at nap.edu and login or register to get:

- Access to free PDF downloads of thousands of publications
- 10% off the price of print publications
- Email or social media notifications of new titles related to your interests
- Special offers and discounts



All downloadable National Academies titles are free to be used for personal and/or non-commercial academic use. Users may also freely post links to our titles on this website; non-commercial academic users are encouraged to link to the version on this website rather than distribute a downloaded PDF to ensure that all users are accessing the latest authoritative version of the work. All other uses require written permission. ([Request Permission](#))

This PDF is protected by copyright and owned by the National Academy of Sciences; unless otherwise indicated, the National Academy of Sciences retains copyright to all materials in this PDF with all rights reserved.

TRANSPORTATION RESEARCH BOARD 2021 ANNUAL REPORT



The National Academies of
SCIENCES • ENGINEERING • MEDICINE
Copyright National Academy of Sciences. All rights reserved.

About TRB and NASEM

The Transportation Research Board (TRB) is one of seven program divisions of the National Academies of Sciences, Engineering, and Medicine—private, nonprofit institutions that provide expert advice on some of the most pressing challenges facing the nation and the world. The work of the National Academies helps shape sound policies; inform public opinion; and advance the pursuit of science, engineering, and medicine. Because TRB is housed within the National Academies, TRB’s staff and volunteers have unequalled access to members of the Academies and their expertise.

TRB’s mission is to provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. TRB’s mission is accomplished through the hard work and dedication of more than 8,000 volunteers and a staff of 130 professionals.



Welcome

A Message from TRB Leadership

We are pleased to present this annual report for the Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine on behalf of the TRB Executive Committee, the thousands of volunteers involved in TRB committees and research panels, and the TRB staff. This year required continued adaptability and resilience as the country endured a second year confronting the COVID-19 pandemic. TRB's volunteers and staff overcame the challenges and accomplished much for our sponsors, our stakeholders, and the nation, which we summarize for you on the following pages.

Throughout the year, TRB was able to fulfill its mission to provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. This was accomplished through the hard work and dedication of more than 8,000 volunteers who are friends and members of TRB's various committees and research panels, as well as TRB's 130 staff members. Much of TRB's work was done virtually during 2021, while continuing to meet TRB's high standards for quality, objectivity, independence, nonpartisanship, integrity, excellence, and an evidence basis in all that we do.

The 2021 TRB Annual Meeting was held virtually for the first time in the organization's 101-year history. More than 20,000 people participated, which broke the record set in 2020 of more than 14,000 Annual Meeting attendees. This included many who had never attended our conference. Many committee meetings had two to three times or more attendees than at 2020's in-person event. Dorval R. Carter, Jr., President of the Chicago Transit Authority, pre-

sented the 2021 Thomas B. Deen Distinguished Lecture, with a focus on equity in transportation. His lecture was then posted on YouTube and has since been viewed more than 5,500 times on various platforms.

Throughout the year, TRB's 177 standing technical committees continued to address current and emerging issues within their scope, including the priority issues of recovering from COVID-19's impact on transportation, supporting the nation's economic recovery from the pandemic, adapting to and mitigating climate change, and addressing transportation-related racial and social equity issues. These committees helped TRB host 10 specialty conferences and cosponsored more than 20 others virtually, including several that were postponed from 2020. In addition, TRB hosted more than 110 webinars during the year.

TRB's multimodal Cooperative Research Programs (CRP) continued unabated through-





out 2021, with 105 publications that ranged from very specific technical topics to broader policy issues. TRB also issued several consensus study reports that offered impactful advice to the federal government and others on important policy issues.

This annual report is organized around and provides information on progress made in achieving the six goals in TRB’s strategic plan, which was adopted by the TRB Executive Committee in June 2019. These goals are:

1. Information Exchange
2. Research
3. Advice
4. Collaboration
5. Workforce Development
6. Communications

We are confident that TRB accomplished a great deal in each of these six areas during 2021.

As TRB looks to 2022 and beyond, we hope to once again be able to meet in person to exchange ideas, share best practices, advance research, collaborate in addressing transportation-related challenges, and interact with professional colleagues and friends. No matter the format, TRB will continue to provide leadership in finding solutions to complex transportation-related problems facing society and in sharing these solutions widely.

As we begin a new year, we hope that you will actively participate in TRB’s convening, research, and advising activities; take advantage of the numerous resources that TRB makes available to the transportation professional community; and learn from the brightest and best who make TRB the premier transportation research organization that it is. By doing so, you will have the opportunity to contribute to solving some of the most vexing transportation-related challenges facing the nation and the world.

The need for TRB’s leadership has never been greater. TRB will continue to adapt to the rapid changes taking place in transportation and in society to ensure that we rise to the challenge. We are all TRB, and we all must work together to provide leadership to create a better future. We look forward to having you join with us in this journey.

Thank you for all that you do for TRB!



Susan Shaheen
TRB Executive Committee Chair
 Professor of Civil and Environmental Engineering and Co-Director of the Transportation Sustainability Research Center at University of California, Berkeley



Nathaniel P. Ford, Sr.
TRB Executive Committee Vice Chair
 Chief Executive Officer of the Jacksonville Transportation Authority



Neil J. Pedersen
TRB Executive Director



TRB's Mission and Work

Strengthening Our Capacity to Contribute to the Well-Being of Our Nation and the World

Since March 2020, resilience and adaptability have become increasingly vital skills worldwide. Change and uncertainty are concepts to which we have all become more accustomed. TRB is leading the way into underexplored territory. As part of a larger scientific organization, TRB's work often intersects with or illuminates the larger scientific challenges of our time. The National Academies of Sciences, Engineering, and Medicine bridges gaps across its various units to provide constantly updating thematic collections of resources.¹ Currently in focus are COVID-19; diversity, equity, and inclusion (DE&I); climate change; and economic recovery. TRB's 2021 resources are featured heavily throughout these pages, and this work has been drawing in a new audience of experts.

Much like transportation and research professionals around the world, TRB staff and volunteers are showing up to work in new ways. We are all learning to embrace new work styles and new ways to communicate and collaborate to achieve a shared mission.



Neil J. Pedersen, TRB Executive Director

TABLE OF CONTENTS

TRB's Mission and Work	3
Goal 1: Information Exchange	6
Goal 2: Research	8
Goal 3: Advise and Inform Policy	10
Goal 4: Collaboration	12
Goal 5: Workforce Development	14
Goal 6: Communication	17
2021 and the Future	20
TRB Volunteer Leadership	22
Appendix A: Statement of Activities	24
Appendix B: Institutional Affiliates	26
Appendix C: TRB Webinars, Conferences, and Workshops	28
Appendix D: Publications	32
Appendix E: TRB Staff	35

Convening, Researching, and Advising

TRB's mission is divided into three interconnected roles: to convene, research, and advise.

TRB officially celebrated its 100th Annual Meeting throughout the month of January in its first-ever virtual platform. TRB's volunteers and friends kept the momentum and excitement of an in-person conference alive by making an extra effort to offer a welcoming and inclusive environment to all meeting attendees. A virtual format gave attendees options they never had before, allowing them to sit in on a single session or, at the other extreme, attend far more sessions by watching events afterwards that they missed the first time around.

In addition to the popular "Our Work is Never Done: Examining Equity Impacts in



Public Transportation” Deen lecture,² other popular sessions focused on transportation industry impacts of COVID-19, decarbonization, automated vehicles, and pedestrian safety. Annual Meeting audience members demonstrated that they are ready to embrace change.

In addition to a record-shattering 20,000-plus attendees at the 2021 TRB Annual Meeting, TRB also brought together volunteers through standing committees, panels, forums, conferences, workshops, meetings, and webinars. The TRB Annual Meeting remains the leading annual event for transportation researchers and professionals to access and share the latest in transportation research. In response to travel restrictions around the ongoing pandemic, convening opportunities continued virtually and allowed even wider participation from the transportation community.

In 2021, more than 5,050 individuals served on TRB’s standing technical committees. In addition, nearly 16,750 volunteers contributed to committee activities as Friends. TRB’s Technical Activities Division convenes these committees, overseeing and managing the committees’ activities in support of TRB’s mission and strategic goals. Ann Brach is Director of the division and George (Avery) Grimes of Patriot

Rail Company serves as the volunteer leader and chair of the Technical Activities Council.

TRB manages a plethora of research projects and publications annually. TRB’s flagship journal, *Transportation Research Record* (TRR), publishes nearly 800 peer-reviewed papers yearly. The journal published special collections this year featuring research about equity and transportation, as well as research from TRB’s Minority Student Fellows and the Graduate Research Award Program on Public-Sector Aviation Issues.

TRB’s bimonthly magazine, *TR News*, features timely articles on new and state-of-the-art research and practice, transportation news, profiles of transportation professionals, new book notices, and news of TRB activities. Issues



Ann Brach
Director, Technical
Activities Division



George (Avery) Grimes
Chair, Technical
Activities Council

DID YOU KNOW?

- More than 130 Texas A&M Transportation Institute employees were able to participate in the virtual 2021 TRB Annual Meeting.
- Nearly one year into the launch of the new National Academies-TRB unified website, traffic has increased by 280 percent—with more than 700,000 monthly visitors.

in 2021 focused on DE&I and the response to climate change and also featured dozens of articles on issues ranging from freight supply chain resilience to airport terminal services and spaces.

TRB manages research programs focusing on highways, public transit, airports, and behavioral traffic safety through its CRP Division with total budgets in excess of \$60 million. Contractors conduct the actual research, and more than 5,950 volunteers serve on CRP oversight committees and project panels. Christopher Hedges is Director of this division. The following TRB volunteers lead the oversight organizations for CRP:

- Joel Jundt of South Dakota Department of Transportation is the chair of the AASHTO Special Committee on Research and Innovation.
- Rhonda Hamm-Niebruegge of St. Louis Lambert International Airport is the chair of the Airport Cooperative Research Program (ACRP) Oversight Committee.
- Tom Glass of Pennsylvania Department of Transportation is chair of the Governors Highway Safety Association (GHSA) Research Committee.
- Doran Barnes of Foothill Transit is the chair of the Transit Cooperative Research Program (TCRP) Oversight and Project Selection Commission.

TRB consensus reports are the result of research performed by committees of volunteer experts supported by staff from the Consensus



“If any of your listeners are not aware of the TRB Minority Fellows program, please look into it. Get to know it. It is fabulous. If you are feeling down and you’re not feeling energized, listen to these kids. I mean, reading through their research projects is awe-inspiring.”

—Carlos Braceras, former TRB Executive Committee Chair, on TRB’s Transportation Explorers podcast

and Advisory Studies Division. Scores of TRB consensus reports have contributed to changes in legislation in the United States, and, in 2021, about 110 volunteers served on committees for this program. Tom Menzies is Director of this division, and Katie Turnbull of Texas A&M Transportation Institute is the TRB volunteer leader and chair of the Subcommittee on Planning and Policy Review.

Either in response to requests from sponsoring agencies or on its own initiative, TRB’s internationally recognized Marine Board identifies research needs and provides a forum for the exchange of information on new technologies, laws and regulations, economics, the environment, and other issues affecting the marine transportation system; port operations; coastal engineering; and marine governance. Martha Grabowski, McDevitt Distinguished Chair in Information Systems at Le Moyne College in Syracuse, New York, and Senior Research Scientist at Rensselaer Polytechnic Institute in Troy, New York, is Marine Board Chair. Scott Brotemarkle of TRB’s Technical Activities Division serves as the Marine Board’s Program Director.



Tom Menzies
Director, TRB Consensus and Advisory Studies



Katie Turnbull
Chair, Subcommittee on Planning and Policy Review



Christopher Hedges
Director, TRB Cooperative Research Programs



Joel Jundt
Chair, AASHTO Special Committee on Research and Innovation



Rhonda Hamm-Niebruegge
Chair, ACRP Oversight Committee



Tom Glass
Chair, Governors Highway Safety Association Research Committee



Doran Barnes
Chair, TCRP Oversight and Project Selection Commission

GOAL 1

Information Exchange

Convening Face-to-Face and Webcam-to-Webcam

In January 2021, vaccinations against the coronavirus disease (COVID-19) were just rolling out. Health precautions made an in-person meeting impossible, and the 2021 TRB Annual Meeting—already known as “the biggest transportation research conference in the world”—grew. Staff and volunteers extended themselves an incredible amount and hosted 20,000 attendees at more than 450 sessions throughout the entire month of January. The event also was home to more than 400 committee and subcommittee meetings. TRB’s Annual Meeting is an opportunity for policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions to meet and address all things transportation. The program covers all transportation modes and nearly every relevant aspect imaginable.

TRB and the National Academies stake their reputations on impartial and rigorous scientific research. It is equally important to share that information with audiences who need it and can put it into action.

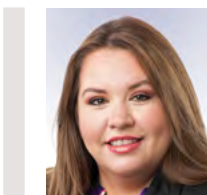
Despite fluctuating permissions and protocols for an in-person gathering, TRB ensured that the diverse transportation community continued to have the opportunity to work together. Many events that were postponed in 2020 went forth in a new format, drawing participants from a spectrum representing the public, private, academic, and user communities. In total, TRB convened or cosponsored 34 conferences, workshops, or meetings in 2021.

Over the summer, TRB hosted three particu-



larly outstanding events featuring especially diverse participants.

- The Automated Road Transportation Symposium (ARTS) panelists represented a wide variety of private industries, as well as academia, government, and research. Topics included safety, business development, roadway operations, public acceptance, and legislative and regulatory affairs that span local, federal, and international spheres. More than 800 people attended the symposium.
- “How We Move Matters,” an event organized with the National Academies Environmental Health Matters Initiative, explored the connections between new and changing ground



“We were able to take the information from ACRP and develop employee training early on while other agencies in our community didn’t have trainings yet.”

—Elsy Borgstedte, Assistant Director,
Laredo International Airport

mobility options and environmental health, featuring experts in public health, consumer behavior, energy, and transportation. A Slack channel allowed for constant conversations between panelists and attendees during the event and for a more lasting connection afterwards.

- TRB’s “Conference on Advancing Transportation Equity” gave a platform to the range of lived and professional experiences of people working on the front lines of transportation equity and justice. Nearly 900 people registered for the conference.

Learning from the Experts Firsthand

TRB’s webinar program has been at the forefront of virtual connections for more than 10 years and continues to offer more sessions every year. Most webinars are based on research published by TRB. More than 350 volunteers shared their knowledge through presentations to 21,000-plus webinar registrants in 2021. Each webinar offers a Question and Answer session, allowing a real opportunity to connect and learn from the exchange.

Early in the pandemic, Laredo International Airport in Texas joined a TRB ACRP webinar on airport plans and responses to communicable disease threats. The webinar and resulting networking opportunities allowed the airport to update its emergency plans and operations and ensure a safe environment.

Finding National and Local Solutions for State Agencies

TRB’s State Partnership Program is a joint effort between TRB and state departments of transportation (DOTs). TRB has visited state DOTs since the 1940s. The pandemic prevented any such visits in 2020. Over the past year, TRB staff developed a pilot effort for virtual visits. Twenty states participated in virtual group visits, and another 10 opted for individual virtual visits in 2021.

TRB IN THE NEWS

- In addition to articles in trade magazines about the Automated Road Transportation Symposium event, TRB volunteer Jane Lappin, who helps organize the conference, was quoted in a *Philadelphia Inquirer* article about easing the public’s concerns about the safety of automated vehicles.
- U.S. Senator Martin Heinrich (D-New Mexico) quoted the TRB consensus study report *Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions* in a *New York Times* op-ed: “Working to electrify our vehicles, homes and businesses is a critical part of achieving economy-wide net-zero emissions by 2050.”¹
- More lanes dedicated to transit allow travelers on a bus or train to zip past traffic jams, which in turn can help shift more drivers out of cars and into transit, writes TRB volunteer Simon Berrebi in Bloomberg CityLab, citing *TCRP Research Report 209: Analysis of Recent Public Transit Ridership Trends*.²
- Automated vehicle tech company Waymo is using data from TRB’s second Strategic Highway Research Program naturalistic driving study to help build out the driving scenarios for autonomous vehicles, notes *The Verge*.³
- A model building better autonomy into vehicles to keep them from veering into other side-by-side vehicles is detailed in TRR and reported on by the University of Nebraska and others.
- The 2020 consensus study report *Leveraging Unmanned Systems for Coast Guard Missions* made recommendations to the U.S. Coast Guard that are now being put into action. As such, the Coast Guard will “take a more strategic and accelerated approach to exploit the capabilities of existing and future unmanned systems,” reported *Sea Power Magazine*.⁴
- LED lighting is no worse for driver alertness and sleep health than the commonly used high-pressure sodium roadway lighting, reports the National Safety Council’s *Family Safety and Health Magazine* and *Transport Topics*, citing *NCHRP Research Report 968: LED Roadway Lighting: Impact on Driver Sleep Health and Alertness* and its related webinar.⁵⁻⁶
- The SEAHIVE marine and estuarine shoreline protection system—developed via the NCHRP Innovations Deserving Exploratory Analysis Program and Florida DOT—will generate data about climate change and sea level rise, with construction beginning next month at Wahoo Bay in Pompano Beach, Florida.

¹ <https://www.nytimes.com/2021/06/08/opinion/climate-change-electricity-fossil-fuels.html>

² <https://www.bloomberg.com/news/articles/2021-04-13/biden-s-infrastructure-plan-must-put-transit-first>

³ <https://www.theverge.com/2021/7/6/22565448/waymo-simulation-city-autonomous-vehicle-testing-virtual>

⁴ <https://seapowermagazine.org/u-s-coast-guard-establishes-uxs-cross-functional-working-group>

⁵ <https://www.safetyandhealthmagazine.com/articles/21255-study-explores-led-roadway-lightings-impact-on-driver-alertness-sleep-health>

⁶ <https://www.ttnews.com/articles/trb-panelists-consider-future-study-potential-led-lighting>

GOAL 2

Research



Covering Timely and Persistent Issues

By conducting, sharing, and promoting research, TRB creates and expands access to knowledge on current and future issues in transportation. TRB research is particularly focused on innovative and implementable practices and technologies. In 2021, TRB complemented 2019’s *Critical Issues in Transportation* report to provide a way to frame future areas of research, policy analysis, and debate with *COVID-19 Addendum to Critical Issues in Transportation* and *Racial Equity Addendum to Critical Issues in Transportation*. At the same time, TRB continues to administer research

into the day-to-day issues facing transportation, including, for example, understanding emissions, network design, and traffic interchanges.

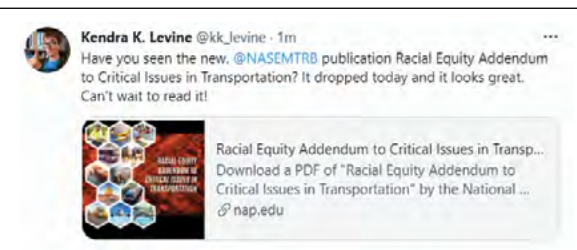
TRR’s Editorial Board, staff, reviewers, and authors contributed to the journal’s largest single jump in impact per the Journal Citation Reports impact factor. The

impact factor is a key measure of a journal’s prestige and can improve the career opportunities of authors published in journals with a high impact factor. TRR also continues to lead the transportation field in policy and patent citations, a measure of its impact in the practitioner community. The journal’s editors and staff are working more than ever to reach new audiences by getting papers of exceptional merit or interest featured in media outlets such as *The Conversation* and many others.³

TRB’s most downloaded publications in 2021 show the country’s focus on future improvements to transportation’s role in climate change, as well as improving safety.

Strengthening Research on Transportation and the Environment

TRB Executive Committee member and National Academy of Engineering member Chris T. Hendrickson served on a National Academies committee that produced *Accelerating Decarbonization of the U.S. Energy System*. The report charts a path to achieving net-zero carbon emissions in the U.S. by 2050 in a way



Released in October, the well-received *Racial Equity Addendum to Critical Issues in Transportation* aims to identify and address inequities and injustices caused and contributed to by transportation.

that would help address climate change, build a more competitive economy, increase high-quality jobs, and help address social injustice.

TCRP and ACRP explored their respective sectors' role in climate change emissions through the following:

- TCRP Research Report 219: *Guidebook for Deploying Zero-Emission Transit Buses*,
- TCRP Research Report 226: *An Update on Public Transportation's Impacts on Greenhouse Gas Emissions*,
- TCRP Research Report 221: *Redesigning Transit Networks for the New Mobility Future*,
- ACRP Research Report 220: *Guidebook for Developing a Zero- or Low-Emissions Roadmap at Airports*, and
- ACRP Web-Only Document 51: *Commercial Space Vehicle Emissions Modeling*.

Understanding emissions is only a piece of the puzzle. Transportation also is concerned with the changes we already see occurring from climate change. Knowledge gaps and a five-year research plan to address them are outlined in *National Cooperative Highway Research Program (NCHRP) Research Report 975: Transportation System Resilience: Research Roadmap and White Papers*.

Advancing Research on Effective Safety Measures

A new forum for coordinated and collaborative research, TRB's Behavioral Traffic Safety Coop-



MOST DOWNLOADED CRP AND CONSENSUS REPORTS PUBLISHED IN 2021

1. *An Update on Public Transportation's Impacts on Greenhouse Gas Emissions*
2. *Redesigning Transit Networks for the New Mobility Future*
3. *The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape*
4. *Guide for Pedestrian and Bicyclist Safety at Alternative and Other Intersections and Interchanges*
5. *Diverging Diamond Interchange Informational Guide, Second Edition*
6. *Guidebook for Deploying Zero-Emission Transit Buses*
7. *Investing in Transportation Resilience: A Framework for Informed Choices*
8. *Mainstreaming System Resilience Concepts into Transportation Agencies: A Guide*
9. *Options for Reducing Lead Emissions from Piston-Engine Aircraft*
10. *Low-Speed Automated Vehicles (LSAVs) in Public Transportation*

erative Research Program (BTSCRP) is a partnership between GHSA, the National Highway Traffic Safety Administration (NHTSA), and TRB. The program develops practical solutions to save lives, prevent injuries, and reduce costs of road traffic crashes associated with unsafe behaviors. The year 2021 saw the publication of BTSCRP's inaugural report, *BTSCRP Research Report 1: Using Electronic Devices While Driving: Legislation and Enforcement Implications*, which received coverage by *Forbes*, ITS International, *Collision Week*, Westat, AASHTO, and Staten Island Live. Policy makers and other stakeholders can reference the newly compiled resources, toolkits, and best practices to identify ways to enhance enforcement and education efforts. Jurisdictions with strong traffic safety laws—supported by enforcement, public education, and outreach—tend to have lower overall traffic fatality rates.

Automated vehicles hold great promise for improving safety and are slowly moving in the right direction. TCRP Research Report 220: *Low-Speed Automated Vehicles (LSAVs) in Public Transportation* and a related webinar present a practitioner guide and current uses of LSAVs. As noted in coverage by *Government Technology* and *Smart Cities Dive*, an unexpected safety benefit was the use of these vehicles in transporting COVID-19 tests and food deliveries without exposing drivers unnecessarily during the pandemic.

GOAL 3

Advise and Inform Policy

As part of the National Academies of Sciences, Engineering, and Medicine, TRB study committees provide formal advice to the federal government through consensus studies and also review of U.S. DOT research programs. Additionally, TRB provides useful information that informs policy discussions at all levels of government through workshops and research reports.

Convening to Advise

Upon request, National Academies–appointed consensus study committees provide advice to Congress, executive branch federal agencies, the states, and other organizations on an array of complex and often controversial transportation topics of national significance. Committee members are selected to provide appropriate expertise and a balance of perspectives on the issues involved. Through such special expert committees, TRB also conducts periodic or continuing reviews of specific transportation research and technology programs. Policy study committee activities are subject to the requirements of Section 15 of the Federal Advisory Committee Act Amendments of 1997.

TRB conducts advisory studies in accordance with procedures of the National Acad-

emies. Congress or executive branch agencies request some studies, while others are self-initiated studies funded by TRB. Committees of volunteer experts supported by staff from TRB’s Consensus and Advisory Studies Division conduct these studies.

Formal policy advice comes through TRB’s consensus studies. Each study committee produces a report with evidence-based conclusions

and recommendations that are subject to the National Academies’ rigorous report review process. As with other research published by TRB this year, the reports reflect transpor-

tation’s connections to and impacts on the environment, health and safety, equity, and the economy.

One consensus study committee examined the country’s increased reliance on shared modes of transportation, such as ride-hailing or scooter- and bike-sharing. The committee concluded that these modes can enhance mobility and sustainability, along with equity. But they will need to be scaled up through public and private partnerships. TRB’s *The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape* recommends that cities, transit agencies, and other mobility providers collaborate in goal-setting, experimentation, testing, and implementation to increase the positive societal benefits of the shared modes. Having been downloaded thousands of times, the report’s potential impact is promising.

Significant progress has been made over the last decade in integrating resilience criteria into transportation decision making based on the framework for measuring and evaluating investments in resilience, as documented in *Investing in Transportation Resilience: A Framework for Informed Choices*. Green Car Congress and Transportation Today explored the report’s findings.^{4–5}

Although leaded gasoline was phased out from use in motor vehicles 25 years ago because of health concerns, it is still used in small gasoline-powered aircraft—as a group the single largest emitter of lead in the country. TRB’s *Options for Reducing Lead Emissions from Piston-Engine Aircraft* finds that significantly reducing these emissions requires leadership and strategic guidance of the Federal Aviation Administration along with a broad-based and sustained commitment by other government agencies, pilots, airport managers, aviation fuel and service suppliers, and aircraft manufacturers. An NBC News article featured the report, asking, “Why are these planes still using toxic fuel?” And an article in *Grist* quoted the report, noting the level of aviation gas emissions.⁶

Allowing people who are nonambulatory to



State, federal, and local transportation agencies utilize TRB workshops and research reports in policy discussions and development.



remain in their personal wheelchairs for airline travel can be beneficial for people who cannot transfer to and from an airline seat. TRB's *Technical Feasibility of a Wheelchair Securement Concept for Airline Travel: A Preliminary Assessment* concluded that providing space inside an airplane cabin for a wheelchair securement does not present any formidable technical challenges.

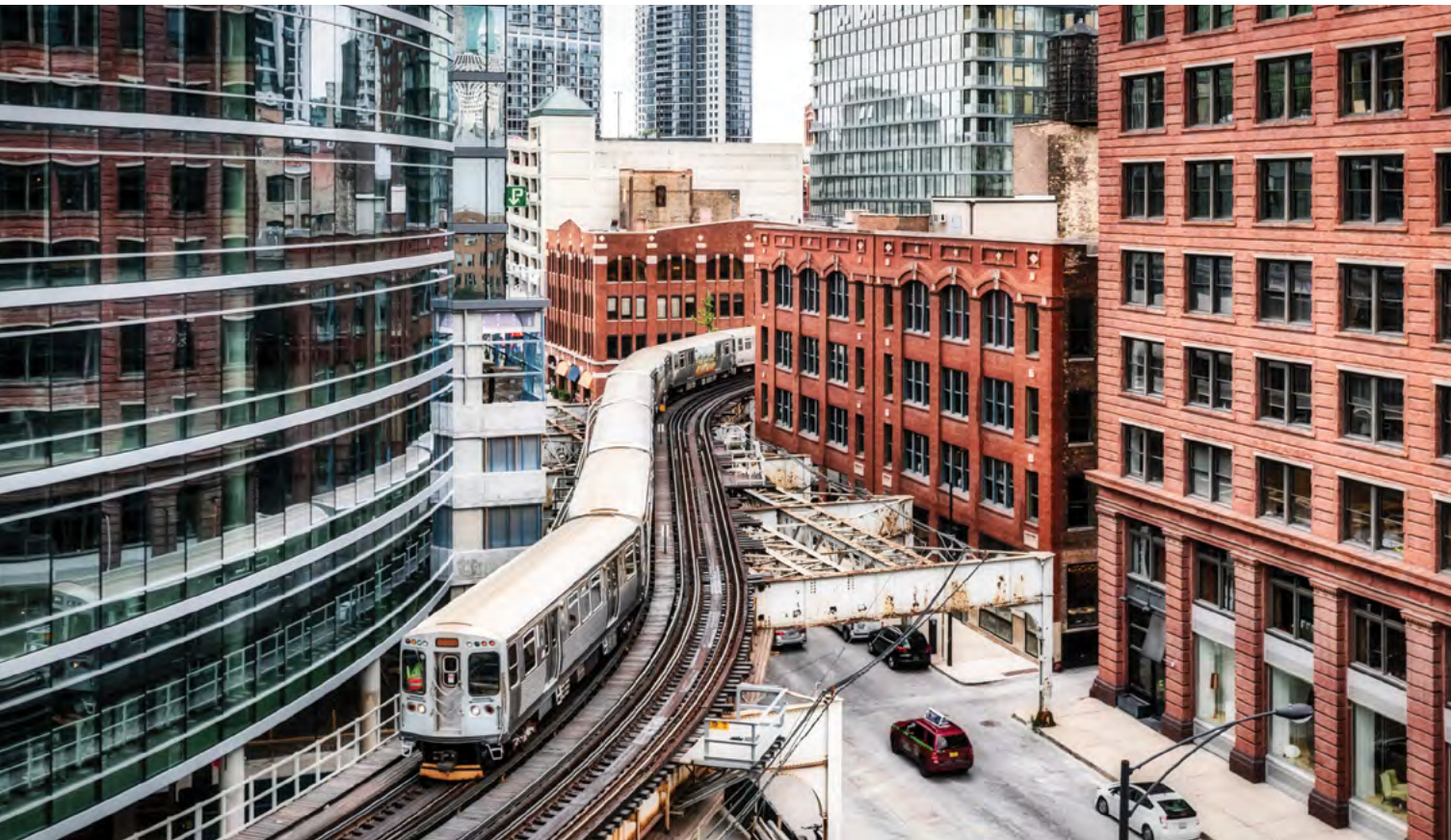
Although equipping enough airplanes with securement systems to provide meaningful levels of airline service would require substantial effort, the types of cabin modifications required to provide the needed space and structural support would likely be of moderate technical complexity for many individual airplanes. The ability of the wheelchairs themselves to be crashworthy and protect the occupant during an emergency landing or survivable crash, however, warrants further evaluation testing. The study committee recommended that a research program be developed for this purpose.

Published in 2019, TRB's *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future* continues down the road as a relevant resource, with

infrastructure high on the national agenda through the latter half of 2021. Along with TRB staff member Monica Starnes, report authoring committee chair Norman Augustine wrote a letter to the editor that appeared in the July 11 edition of the *Wall Street Journal* about finding new sources of funding for U.S. interstates, citing the consensus report.⁷ Looking further back, TRB's *Improving Motor Carrier Safety Measurement*, published in 2017, has led to a new U.S. DOT methodology, as noted on July 3 in *Homeland Security Today*.

As policy continues to develop, TRB research lives a long and useful life. Other consensus reports released in 2021 include the following:

- *Preparing for LNG by Rail Tank Car: A Review of a U.S. DOT Safety Research, Testing, and Analysis Initiative;*
- *Modernizing the U.S. Offshore Oil and Gas Inspection Program for Increased Agility and Safety Vigilance;* and
- *Options for Improving the Safety of DUKW Type Amphibious Vessels.*

GOAL 4**Collaboration**

Communities of Individuals

TRB's standing technical committees operated for their first full year in the new committee structure that was implemented in 2020. New and rescoped committees addressed transportation and health, as well as equity issues in transportation. Sustainability and resilience have received renewed attention, and transportation infrastructure committees have realigned themselves to work better across disciplinary areas and facilitate a more multimodal approach to infrastructure. A new concept—coordinating councils—supports collaboration across committees on issues related to international transportation concerns and transportation issues in rural areas and cities. Committees continue to increase the diversity of their membership. The Technical Activities

Council has established a Blue Ribbon Committee award to recognize best practices in promoting committee diversity.

Strengthening Domestic and International Partnerships

The transportation industry is complex and comprises a wide range of actors. TRB partners with other organizations to ensure its advice, research, and collaboration includes all voices. TRB has entered into memoranda of understanding or letters of intent with many domestic and international organizations to partner and work together on activities for mutual benefit. In 2021, TRB entered into new arrangements with Latinos in Transit and the World Bank and cosponsored many joint webinars with partner organizations to discuss current

and emerging issues, with volunteers and staff participating.

In addition to these partnerships, TRB volunteers helped create content for nearly two dozen cosponsored conferences held this year.

Considering the Future

To share perspectives on new issues and challenges surrounding automated vehicles and shared mobility, TRB hosts the Forum on Preparing for Automated Vehicles and Shared Mobility Systems. Topics discussed during forum events are varied and include opportunities for automated vehicles and shared mobility modes to benefit transportation and society through increased safety, reduced congestion, enhanced accessibility and equity, and increased environmental and energy sustainability.

Expert Collaborations Moving Forward

TRB staff and volunteers share resources and expertise across the transportation industry. The University of Central Florida credits its work with TRB and NCHRP for helping its civil engineering program flourish, receive many accolades, and continue recruiting top talent.

NHTSA's *Countermeasures That Work* report notes that it draws heavily from



NCHRP's guides for state DOTs to use in implementing the AASHTO Strategic Highway Safety Plan.

To give more attention to papers on equity and transportation in TRR, staff coordinated press releases with authors' institutions, including The University of Texas at Austin, Portland State University in Oregon, and the University of Michigan. The Equity and Transportation collection papers are available via open access.



GOAL 5

Workforce Development

Growing Transportation Careers at All Levels

Through its collaborative structure, TRB is an ideal home for informal mentoring. From a first job through experience as a seasoned expert, TRB connects professionals to colleagues within their industry and in the larger transportation field. The Minority Student Fellows Program welcomed another outstanding class to the 2021 TRB Annual Meeting. Graduate-level aviation students present and publish work in TRR through close work with advisors in the ACRP Graduate Research Awards. Undergraduate students are eligible for ACRP's University Design competition.

For the past three years, TRB has been conducting a large in-person transportation career fair, Careers in Motion, at the Annual Meeting—

along with an ongoing comprehensive slate of programming to cultivate top-notch professional development skills—to better serve the needs of young professionals and seasoned job seekers. TRB held its first virtual Careers in Motion Networking Fair in 2021, with nearly 30 employers participating. The virtual platform allowed for easier access to candidates from across the globe, featured phone and video functionality, and enabled employers to interact with hundreds of job seekers. The career fair once again offered opportunities for experts to review and provide feedback on job seekers' resumes.

Supporting the Workforce

CRP publications offer practical insights and frameworks for transportation practitioners. Research is often divided by mode of transpor-





Twenty-five Minority Student Fellows from 17 minority-serving institutions presented posters at the 2021 TRB Annual Meeting. Three fellows' papers were published in TRR. Two received the Alumni Scholarship Award to attend the 2022 Annual Meeting.

tation; however, the issues cross industry lines. Popular research reports in 2021 focused on cultivating talent, strengthening resilience, and improving DE&I in the industry.

- *ACRP Research Report 230: Enhancing Academic Programs to Prepare Future Airport Industry Professionals* offers guidance for airport professionals and academia in preparing graduates for careers as airport industry professionals. *ACRP Research Report 232: Playbook for Cultivating Talent in the Airport Environment* provides inspiring, proven, and readily implementable techniques for airport leaders and managers. *NCHRP Synthesis 567: Summary State DOT Practices for Developing and Implementing TSMO Plans* documents current practices related to the development and implementation of transportation systems management and operations plans.
- *NCHRP Research Report 970: Mainstreaming System Resilience Concepts into Transportation Agencies: A Guide* offers a tool for agencies to self-assess their efforts to improve the resilience of the transportation system through mainstreaming resilience concepts into agency decision making and procedures. *NCHRP Research Report 976: Resilience Primer for Transportation Executives* outlines the state transportation CEO's role in resilience and presents approaches taken in various states, along with concepts and tools.
- *TCRP Research Report 228: Resource Guide for Improving Diversity and Inclusion Programs for the Public Transportation Industry* covers how diversity programs at transit

agencies have evolved; how inclusion has been incorporated; and what policies, plans, and practices have been successfully implemented. A TRB blog post on transportation workforce diversity further outlines TRB resources in the field.⁸

In many cases, COVID-19 affected transportation workers more than those in other professions, with many employees deemed critical from the beginning of the pandemic. In early 2021, TRB published a blog post on resources available to keep the workforce safe and healthy. Another blog post examined resources to improve the safety of active work zones.

Interactive and Inclusive Learning Opportunities

Every year, TRB offers professional development to thousands of participants through an extensive webinar program. More than 150 credit hours were offered via professional development accreditation services across TRB's more than 100 total webinars in 2021. TRB webinars have a loyal following: More than 80 percent of attendees join regularly, and the satisfaction rate remains above 90 percent. This year more than 18,800 state DOT employees attended TRB webinars, receiving more than 2,700 total accreditation hours. State DOT employees in California, North Carolina, and Wisconsin led the pack in taking advantage of the courses freely available to sponsors.

While addressing a number of specific technical issues challenging transportation professionals, TRB offered five webinars for improving DE&I, six related directly to economic recovery, and eight focused on reducing and preparing for climate change. To ensure TRB webinars are reflective of the transportation research community, an emphasis was placed on diverse perspectives and equity con-



This was the most successful interaction I had at a virtual show. Careers in Motion is an excellent networking event to have at the TRB Annual Meeting. It allows us time to meet one-on-one with individual candidates.

—Amy Gilleece, National Events Leader Advisory, PM/CM, Transportation, WSP USA



TOP FIVE WEBINARS BY NUMBER OF PARTICIPANTS

- Redesigning Transit Networks for the New Mobility Future (613)
- Addressing Justice in Transportation (569)
- Fixing the Bump at the End of the Bridge (563)
- Truck Assumptions for Roundabout Design (543)
- Centering Seams—Maintaining Centerline Joints in Asphalt Pavements (492)

Data as of October 2021.

siderations in the guidelines for proposing and presenting webinar topics.

Research contractors are likely to be most successful and produce results relevant to all users when they bring diverse perspectives and experiences to their teams and research plans. To help broaden the expertise and diversity needed to conduct ACRP research, staff

launched ACRP Project Teaming Opportunities, a forum that allows diverse business owners and a wide range of research specialists to easily identify themselves and find each other to team up, even before a project is started.

Putting Research to Work

Eagle River Union Airport is in the middle of a popular fishing, hiking, biking, and outdoor adventure destination in Wisconsin’s Northwoods. Rob Hom, Eagle River Union Airport manager, saw a potential for missed fuel sales through self-serve fueling equipment and turned to *ACRP Research Report 192: Airport Management Guide for Providing Aircraft Fueling Services*.

“Though we had anticipated that this infrastructure improvement would enhance our services and reduce operational expenses, the economic analysis tools included in the report really saved time and effort to present useful information to assist with the decision-making process,” says Hom.

GOAL 6

Communication

In July, TRB's Executive Committee approved a new strategic communications plan, which outlines tactics most likely to help TRB meet and exceed the following documented communications objectives:

- Increase awareness of TRB products, activities, and services;
- Communicate the value of TRB to TRB sponsors, potential sponsors, and the larger transportation community;
- Make TRB the “go-to,” essential, up-to-date source for information on transportation research-related issues;
- Increase the impact of TRB in solving transportation and societal problems and issues; and
- Increase the influence of staff, partners, and collaborators in communicating TRB's information and messaging and helping to protect and enhance the reputation of TRB and the Academies.

TRB continues to put the new strategic communications plan into practice, adding sub-

strategies to the plan—including strategic and documented plans for social media, event promotion, influencer partnerships, and more. This strategic communication is aligned with and part of TRB's overall strategic plan, which is currently being updated and scheduled to be approved in 2022.

Staying Up to Date

Following the successful launch of TRB's new website in 2020, TRB rolled out an updated look and platform for its flagship weekly newsletter. *TRB Weekly* allows our tens of thousands of readers to tailor their subscriptions to get as little or as much transportation research news as they desire. The modernized layout and responsive design is perfectly suited for reading on phones, tablets, and smaller screens, in addition to laptops and desktops. It allows TRB to be more flexible and creative in curating content for the newsletter.

In addition to *TRB Weekly*, three mode-specific listservs send out announcements of new projects, calls for nominations, calls for





problem statements, and requests for proposals as they arise. Listserv subscribers often are responsible for further spreading the message at their university transportation centers, professional groups, consultancies, or state DOTs.

Reaching New Audiences

These major changes to our website and newsletter will better allow us to strategically grow our audience through these and other platforms, including our rapidly growing social media presence. Among the findings in the TRR article “Twelve-Year Analysis of Transportation Research Board Annual Meeting’s Official Hashtag” is a need to implement and improve strategies that help transportation research communities encourage continuous and active participation during and after conferences.⁹

TRB gave additional attention to key specialty conferences on social media. In a single week in July, TRB live-tweeted about ARTS and the How We Move Matters Environmental Health Matters Initiative. Communicating more aggressively about ARTS allowed TRB to strengthen ties with an established audience, while communicating about How We Move Matters helped reach important audiences traditionally focused on environmental health.

Communications for ARTS extended well beyond social media, with registered attendees including famed YouTuber Road Guy Rob and journalists from the *Washington Post*, *Wall Street Journal*, CNN, *WIRED*, SiriusXM, and others. Ads for the symposium in TRB’s weekly e-newsletter and on the Transportation Research International Documentation (TRID) database garnered thousands of clicks weekly for more than a month. A conference-specific newsletter went out daily to registrants who subscribed.

TRBAM Express, another new conference-specific newsletter, also debuted this year. The newsletter reached more than 20,000 attendees of the month-long Annual Meeting, with nine total issues. Updates to the meeting schedule, technical advice for accessing online presentations, and social media coverage were some of the most popular items in the newsletters.

Well-positioned products like TRB webinars have a loyal audience base but continue to attract new audiences. A survey of webinar attendees in 2021 found that 12 percent were new to TRB webinars.

New Ways to Stay Up to Date

TRB launched a new podcast series in 2021, *TRB’s Transportation Explorers*, in which hosts Elaine Ferrell and Paul Mackie interview



TRB volunteers on some of the hottest topics in transportation. The nearly two dozen episodes are available for subscribers or one-time listeners on all major podcast platforms. Former Transportation Secretary Anthony Foxx discussed equity issues; Alicia Trost, Chief Communications Officer at San Francisco's Bay Area Rapid Transit District, updated listeners on the Bay Area's transportation efforts with the COVID-19 vaccine; and Secretary of the Louisiana Department of Transportation and Development Shawn Wilson tackled climate change resilience.

TRB's still-new blog on its website continues to corral the vast amount of research on all modes of transportation that is housed under our roof. The content is designed to give audiences an easy way to find exactly the research they need. The International Grooving and Grinding Association tweeted a link to its followers to TRB's blog post on distracted driving, and AASHTO's journal cited it.¹⁰ The author of a TRR paper thanked TRB on Twitter for including information presented in the research in a blog feature on work zone safety.¹¹ Kent State University featured TRB's blog post on passenger transportation.¹²

TRB continues to develop and maintain the Transportation Research Information Services (TRIS) databases, including TRID and the Transportation Research Thesaurus (TRT). TRID is the world's largest, most comprehensive bibliographic resource on published and ongoing transportation research, with more than 1.3 million records and more than 345,000 links to free or fee-based full text. TRID includes data sets and technical reports from state and federal DOTs; projects on ongoing, recently completed, or soon-to-be-started research from TRB's Research in Progress database; and comprehensive coverage of peer-reviewed transportation journals.

TRT provides a common and consistent language for use by producers and users of transportation information and is being modernized to increase its value to a growing community of stakeholders. The thesaurus comprises more than 12,000 terms, and its website features improved browse and search options, customized exports, and curated lists of "hot topic" terms.

Several TRB Executive Committee members joined Joe Biden's presidential adminis-



tration in 2021. Vicki Arroyo, 2019 Executive Committee chair, was appointed associate administrator of the Office of Policy at the U.S. Environmental Protection Agency. Executive Committee member Nuria Fernandez was confirmed as Federal Transit Administrator. And Steve Cliff, the ex officio Executive Committee member representing the California Air Resources Board, was appointed deputy administrator of NHTSA.

TRB volunteers spoke out about safety, equity, and climate change. Reese Brewer was quoted in Arkansas's *Fort Smith Times Record* about equity, noting that adding microfreight hubs in often-underserved communities could be more fair and equitable for potentially marginalized neighborhoods.

A paper published in TRR, "Identification of Optimal Left-Turn Restriction Locations Using Heuristic Methods," makes a safety case for removing left-turn lanes in cities and was covered by *Popular Mechanics*, *ZME Science*, and the *Times of London*. TRB volunteer Vikash Gayah furthered the message through an op-ed published in Wisconsin's *La Crosse Tribune* and Missouri's *St. Louis Post-Dispatch*. Inspired by NCHRP research, Missouri DOT will improve at least one of its own left turns by installing a "J-turn," according to the *Daily Journal Online*.

As climate change continues to threaten current and future transportation options, TRB volunteer Herby Lissade spoke with Smart Cities Dive about the feasibility for an underground transit loop in Ft. Lauderdale, Florida.



2021 and the Future

The National Research Council, the operating arm of the National Academies, adopted a new strategic plan in early 2021, defining the organizational vision, mission, and values.¹³ TRB is working actively to develop a new strategic plan, with input from staff and volunteers, to be in alignment with the National Research Council strategic plan. It will particularly emphasize anticipating and preparing for current and future transportation-related challenges and opportunities; expanding TRB's impact; and ensuring TRB's continued creativity, resilience, and sustainability. The plan is scheduled to be adopted in mid-2022.

Upcoming Work on Climate Change, Equity, COVID-19, and Economic Recovery

Forthcoming research will pay further attention to the most crucial topics facing the nation and

the world. A few specific examples of our broad portfolio of work include the following:

- Research is under way on NCHRP guidelines for roadside management and technology that can benefit safety, ecology, and the economy.
- Another NCHRP project will assess regulator air pollution dispersion models to better quantify the impacts of transportation sector greenhouse gas emissions.
- An ACRP publication will help clarify the relationship between air service and economic development.
- Airports and travelers can expect further research from ACRP to understand and mitigate the risk of communicable disease transmission.

TRB also will continue its work on the full range of topics and issues of concern to its





Russell W. Houston
TRB Associate
Executive Director



Patrice A. Davenport
Director, Strategic
Program Development



Paul Mackie
Director, TRB
Communications/Media,
Office of the Chief
Communications Officer



Gary Walker
Senior Deputy Director,
TRB Program Finance,
Office of the Chief
Financial Officer

standing technical committees and research programs. Consensus reports in the works will cover topics from aviation safety trends and metrics for transportation equity to pipeline automatic shutoff valves and repurposing infrastructure plastic waste.

The year 2021 has been unusual for everyone. At TRB, nearly all events and meetings were held virtually, so we look forward to 2022 and hope to hold in-person meetings and conferences as the conditions of the pandemic allow. Some of those upcoming events include

- The TRB Annual Meeting in January in Washington, D.C.;
- The Conference on Sustainability and Emerging Transportation Technology in March in Irvine, California;
- The Symposium on Managed Lanes in May in Atlanta, Georgia;
- The International Conference on Roundabouts in May in Monterey, California; and
- TRANSED: Mobility, Accessibility, and Demand Response Transportation Conference in September in Seattle, Washington.

Endnotes

1 For more, visit <https://www.nationalacademies.org/topics>.

2 View the video at <https://youtu.be/1BMgn5lvm3c>.

3 This article, which cites the TRR paper “Deep Learning-Based Visual Identification of Signs of Bat Presence in Bridge Infrastructure Images: A Transfer Learning Approach,” is available at <https://theconversation.com/artificial-intelligence-can-help-highway-departments-find-bats-roosting-under-bridges-166806>.

4 For more, see <https://www.greencarcongress.com/2021/08/20210811-resilience.html>.

5 To read the report, visit <https://transportationtodaynews.com/news/23724-report-recommends-usdot-include-resilience-factors-when-considering-projects>.

6 For more, see <https://grist.org/regulation/avgas-lead-epa-aviation-san-jose-reid-hillview>.

7 “Finding New Funds for the Interstate Highway System” can be accessed at <https://www.wsj.com/articles/finding-new-funds-for-the-interstate-highway-system-11626021590>.

8 To read the blog post, visit <https://www.nationalacademies.org/trb/blog/steps-for-transportation-workforce-diversity-outlined-in-trb-research>.

9 The paper is available at <https://journals.sagepub.com/doi/full/10.1177/03611981211037232>.

10 To read the blog post, visit <https://www.nationalacademies.org/trb/blog/laws-and-safety-efforts-can-prevent-distracted-driving>.

11 The blog post can be found at <https://www.nationalacademies.org/trb/blog/work-zones-need-detailed-research-planning-and-technology-to-be-made-safe>.

12 To read the blog post, visit <https://www.nationalacademies.org/trb/blog/passenger-transportation-takes-off-in-new-directions>.

13 To view the National Research Council strategic plan, visit https://www.nationalacademies.org/documents/link/web?!dcService=GET_JLE&dLinkId=LDo3D446FoBA296DA9440EBB9739B64B92A9477E7306&item=fileGUID%3aDB4DC1FoF8C6D4707DAA110A4790523122A000124DB5&scsOriginalFileName=rc-sp-final.pdf.

TRB Volunteer Leadership

TRB’s Executive Committee provides strategic direction and oversight of TRB’s programs and activities. The 26 appointed members of the volunteer Executive Committee are chosen from among public- and private-sector executives, prominent academicians, and members of the National Academies. In addition, 19 ex officio members—top executives from

TRB’s sponsoring agencies—serve on the Executive Committee. There are two additional ex officio voting members; however, they are former chairs rather than representatives of sponsoring agencies. As TRB Executive Director, Neil Pedersen is the only staff member on the committee.

Transportation Research Board 2021 Executive Committee*



Susan A. Shaheen, Professor, Civil and Environmental Engineering, and Co-Director, Transportation Sustainability Research Center, University of California, Berkeley



Nathaniel P. Ford, Sr., Chief Executive Officer, Jacksonville Transportation Authority, Jacksonville, Florida



Neil J. Pedersen, Executive Director, Transportation Research Board, Washington, D.C.



Michael F. Ableson, CEO, Arrival Automotive–North America, Detroit, Michigan



Marie Therese Dominguez, Commissioner, New York State Department of Transportation, Albany



Ginger Evans, Chief Strategy Officer, CAG Holdings, Inc., Washington, D.C.



Michael F. Goodchild, Professor Emeritus, Department of Geography, University of California, Santa Barbara



Diane Gutierrez-Scaccetti, Commissioner, New Jersey Department of Transportation, Trenton



Susan Hanson, Distinguished University Professor Emerita, Graduate School of Geography, Clark University, Worcester, Massachusetts



Stephen W. Hargarten, Professor, Emergency Medicine, Medical College of Wisconsin, Milwaukee



Chris T. Hendrickson, Hamerschlag University Professor of Engineering Emeritus, Carnegie Mellon University, Pittsburgh, Pennsylvania



S. Jack Hu, UGA Foundation Distinguished Professor of Engineering, Senior Vice President for Academic Affairs, and Provost, University of Georgia, Athens



Randell Iwasaki, Leader, State and Local Transportation for Amazon Web Services, Walnut Creek, California



Ashby Johnson, Executive Director, Capital Area Metropolitan Planning Organization, Austin, Texas



William Kruger, Vice President, UPS Freight for Fleet Maintenance and Engineering, Richmond, Virginia



Julie Lorenz, Secretary, Kansas Department of Transportation, Topeka



Michael R. McClellan, Vice President–Strategic Planning, Norfolk Southern Corporation, Norfolk, Virginia



Patrick K. McKenna, Director, Missouri Department of Transportation, Jefferson City



Brian W. Ness, Director, Idaho Transportation Department, Boise



Craig E. Philip, Research Professor and Director, VECTOR, Department of Civil and Environmental Engineering, Vanderbilt University, Nashville, Tennessee



Leslie S. Richards, General Manager, Southeastern Pennsylvania Transportation Authority, Philadelphia



Kevin J. Thibault, Secretary, Florida Department of Transportation, Tallahassee



James M. Tien, Distinguished Professor and Dean Emeritus, College of Engineering, University of Miami, Coral Gables, Florida



Shawn Wilson, Secretary, Louisiana Department of Transportation and Development, Baton Rouge



Michael R. Berube, Deputy Assistant Secretary for Sustainable Transportation, U.S. Department of Energy, Washington, D.C. (*ex officio*)



Amit Bose, Deputy Administrator, Federal Railroad Administration, Washington, D.C. (*ex officio*)



Carlos M. Braceras, Executive Director, Utah Department of Transportation, Salt Lake City (*ex officio*)



Tristan Brown, Deputy Administrator, Pipeline and Hazardous Materials Safety Administration, Washington, D.C. (*ex officio*)



Steven Cliff, Deputy Administrator, National Highway Traffic Safety Administration, Washington, D.C. (*ex officio*)



Richard Corey, Executive Officer, California Air Resources Board, Sacramento (*ex officio*)



Stephen M. Dickson, Administrator, Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C. (*ex officio*)



Nuria I. Fernandez, Administrator, Federal Transit Administration, Washington, D.C. (*ex officio*)



LeRoy Gishi, Chief, Division of Transportation, Bureau of Indian Affairs, U.S. Department of the Interior, Germantown, Maryland (*ex officio*)



Martha R. Grabowski, McDevitt Distinguished Chair in Information Systems, Le Moyne College, Syracuse, New York, and Senior Research Scientist, Rensselaer Polytechnic Institute, Troy, New York (*ex officio*)



William H. Graham, Jr. (Major General, U.S. Army), Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers, Washington, D.C. (*ex officio*)



John T. Gray II, Senior Vice President, Policy and Economics, Association of American Railroads, Washington, D.C. (*ex officio*)



Robert Hampshire, Deputy Assistant Secretary for Research and Technology, U.S. Department of Transportation, Washington, D.C. (*ex officio*)



Meera Joshi, Deputy Administrator, Federal Motor Carrier Safety Administration, Washington, D.C. (*ex officio*)



Eleftheria Kontou, Assistant Professor, University of Illinois, Urbana-Champaign, Urbana, and Chair, TRB Young Members Coordinating Council (*ex officio*)



Stephanie Pollack, Deputy Administrator, Federal Highway Administration, U.S. Department of Transportation, Washington, D.C. (*ex officio*)



Craig A. Rutland, U.S. Air Force Pavement Engineer, U.S. Air Force Civil Engineer Center, Tyndall Air Force Base, Florida (*ex officio*)



Karl Simon, Director, Transportation and Climate Division, U.S. Environmental Protection Agency, Washington, D.C. (*ex officio*)



Paul P. Skoutelas, President and CEO, American Public Transportation Association, Washington, D.C. (*ex officio*)



Katherine F. Turnbull, Executive Associate Director and Regents Fellow Research Scientist, Texas A&M Transportation Institute, College Station (*ex officio*)



Jim Tymon, Executive Director, American Association of State Highway and Transportation Officials, Washington, D.C. (*ex officio*)

* Membership as of November 2021.

APPENDIX A

Statement of Activities

Funding Support by Program and Expenditures, Calendar Years 2020 and 2021

	2020 (ACTUAL)	2021 (PROJECTED)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$7,910,000	\$8,004,000
Federal Government		
Federal Highway Administration (FHWA)	1,425,000	1,400,000
Federal Transit Administration (FTA)	187,000	194,000
National Highway Traffic Safety Administration (NHTSA)	162,000	127,000
Department of the Interior	85,000	85,000
Office of the Assistant Secretary of Transportation for Research and Technology (OST-R)	225,000	81,000
Department of Energy (DOE)	74,000	76,000
Environmental Protection Agency	74,000	76,000
U.S. Air Force Civil Engineer Center	74,000	76,000
U.S. Army Corps of Engineers	25,000	75,000
Federal Aviation Administration (FAA)	54,000	42,000
Federal Railroad Administration	54,000	38,000
Pipeline and Hazardous Materials Safety Administration	0	25,000
Federal Motor Carrier Safety Administration	56,000	31,000
Subtotal, Federal Government	\$2,495,000	\$2,326,000
Other		
California Air Resources Board	79,000	81,000
American Public Transportation Association	74,000	76,000
Association of American Railroads	74,000	76,000
Fees and Sales	2,853,000	4,398,000
Subtotal, Other	\$3,080,000	\$4,631,000
Total, Core Technical Activities	\$13,485,000	\$14,961,000
Marine Board Core Program		
U.S. Coast Guard	75,000	75,000
U.S. Army Corps of Engineers	75,000	75,000
Office of Naval Research	65,000	65,000
National Oceanic and Atmospheric Administration	40,000	40,000
Bureau of Safety and Environmental Enforcement	30,000	30,000
Maritime Administration	19,000	19,000
U.S. Navy Supervisor of Salvage and Diving	12,000	12,000
Total, Marine Board Core Program	\$316,000	\$316,000
Cooperative Research Programs		
National Cooperative Highway Research Program (State DOTs)	43,869,000	41,362,000
Airport Cooperative Research Program (FAA)	12,503,000	12,607,000
Transit Cooperative Research Program (FTA)	5,093,000	4,485,000
Behavioral Traffic Safety Cooperative Research Program (Governors Highway Safety Association, NHTSA)	1,163,000	1,735,000
National Cooperative Freight Research Program (OST-R)	32,000	0
Total, Cooperative Research Programs	\$62,660,000	\$60,189,000

	2020 (ACTUAL)	2021 (PROJECTED)*
Rail Safety IDEA Program	\$367,000	\$220,000
Evaluations of FHWA Research and Technology Program Projects	\$791,000	\$682,000
Second Strategic Highway Research Program Safety Data, Phase 1	\$1,392,000	\$0
Policy Studies	\$2,313,000	\$2,804,000
Conferences, Workshops, Forums, Research Projects, and TRB Centennial	\$1,350,000	\$945,000
TRB TOTAL	\$82,674,000	\$80,117,000
Sources of Funds		
Federal	26,571,000	25,131,000
State DOTs	51,779,000	49,366,000
Other	4,324,000	5,620,000
	\$82,674,000	\$80,117,000
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	16,823,000	16,417,000
Travel and Meetings	1,452,000	251,000
Editing, Abstracting, and Publishing	1,489,000	1,048,000
Consultants and Contracts	42,970,000	40,418,000
Other Direct Costs	2,035,000	2,182,000
Indirect Costs	19,522,000	18,937,000
Total Expenditures	\$84,291,000	\$79,253,000

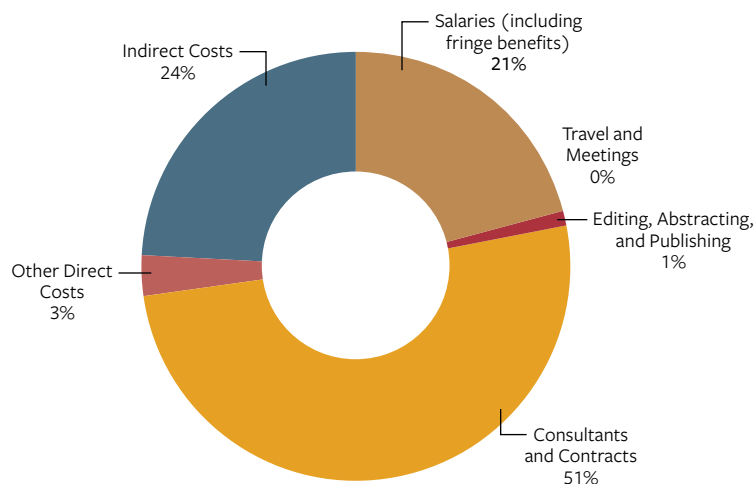
TRB Reserve Fund

Fund balance, end of previous fiscal year	\$19,206,000	\$17,589,000
Plus (minus) current fiscal year income over (under) expenditures	(1,617,000)	864,000
Balance, current fiscal year	\$17,589,000	\$18,453,000

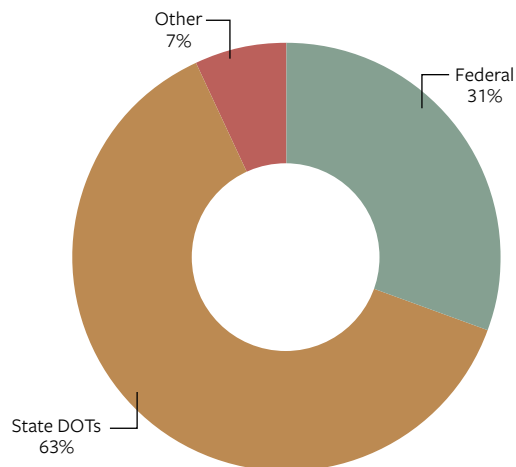
In 1965, the TRB Executive Committee approved a reserve fund to provide for orderly adjustments in the event of a temporary shortfall in anticipated revenues for TRB technical activities. This fund, built up over the years from surplus income in excess of expenditures from nonfederal sources for any one fiscal year, is reserved for expenditures in excess of income for any later fiscal year under a fixed budget approved annually by the TRB Executive Committee.

* Calendar Year 2021 comprises actual data through October and estimates for the remainder of the year.

Distribution of TRB Expenditures



TRB Funding Support



APPENDIX B

Institutional Affiliates

Sponsors

State Transportation Departments

(Listed with TRB Representatives)

Alabama Department of Transportation

Juanita Owens

Alaska Department of Transportation and Public Facilities

Anna Bosin

Arizona Department of Transportation

Dianne Kresich

Arkansas State Highway and Transportation Department

Christopher Dailey

California Department of Transportation

Dara Wheeler

Colorado Department of Transportation

Stephen Cohn

Connecticut Department of Transportation

Edgardo Block

Delaware Department of Transportation

Drew Boyce

District Department of Transportation

Stephanie Dock

Florida Department of Transportation

James D. Dockstader

Georgia Department of Transportation

Supriya Kamatkar

Hawaii Department of Transportation

Casey C. Abe

Idaho Transportation Department

Ned E. Parrish

Illinois Department of Transportation

Megan Swanson

Indiana Department of Transportation

Barry K. Partridge

Iowa Department of Transportation

Peggi S. Knight

Kansas Department of Transportation

Daniel Wadley

Kentucky Transportation Cabinet

Jason Siwula

Louisiana Department of Transportation and Development

Samuel Cooper

Maine Department of Transportation

Dale Peabody

Maryland State Highway Administration

Richard Y. Woo

Massachusetts Department of Transportation

Stephen Woelfel

Michigan Department of Transportation

Carol Aldrich

Minnesota Department of Transportation

Hafiz Munir

Mississippi Department of Transportation

Cynthia Smith

Missouri Department of Transportation

Jennifer Harper

Montana Department of Transportation

Susan C. Sillick

Nebraska Department of Roads

Mick S. Syslo

Nevada Department of Transportation

Ken Chambers

New Hampshire Department of Transportation

Ann Scholz

New Jersey Department of Transportation

Amanda Gendek

New Mexico Department of Transportation

Randy Trujillo

New York State Department of Transportation

Wei-Shih Yang

North Carolina Department of Transportation

Neil Mastin

North Dakota Department of Transportation

Matthew Linneman

Ohio Department of Transportation

Vicky Fout

Oklahoma Department of Transportation

David Ooten

Oregon Department of Transportation

Michael Edward Bufalino

Pennsylvania Department of Transportation

Brian Wall

Rhode Island Department of Transportation

Christos Xenophontos

South Carolina Department of Transportation

Terry Swygert

South Dakota Department of Transportation

David L. Huft

Tennessee Department of Transportation

David Lee

Texas Department of Transportation

Kevin Pete

Utah Department of Transportation

Cameron T. Kergaye

Vermont Agency of Transportation

Emily Parkany

Virginia Department of Transportation

Catherine McGhee

Washington State Department of Transportation

Anne Freeman

West Virginia Department of Transportation

Perry Keller

Wisconsin Department of Transportation

Diane Gurtner

Wyoming Department of Transportation

Timothy McDowell

Federal Government

U.S. Department of Transportation

Federal Aviation Administration

Federal Highway Administration

Federal Motor Carrier Safety Administration

Federal Railroad Administration

Federal Transit Administration

National Highway Traffic Safety Administration

**Office of the Assistant Secretary of Transportation for
Research and Technology**

Pipeline and Hazardous Materials Safety Administration

U.S. Air Force Civil Engineer Center

U.S. Army Corps of Engineers

U.S. Coast Guard

U.S. Department of Energy

U.S. Department of the Interior

U.S. Environmental Protection Agency

Other Organizations

**American Association of State Highway and Transportation
Officials**

American Public Transportation Association

Association of American Railroads

California Air Resource Board

Marine Board Sponsors

**Bureau of Safety and Environmental Enforcement
Maritime Administration**

National Oceanic and Atmospheric Administration

Office of Naval Research

Office of the Supervisor of Salvage and Diving, U.S. Navy

U.S. Army Corps of Engineers

U.S. Coast Guard

Global Affiliate Sustaining Circle

Applied Research Associates, Inc.

Caliper Corporation

HDR

HNTB

Jacobs

Kittelson & Associates, Inc.

Michael Baker International, Inc.

National Transportation Safety Board

Port Authority of New York and New Jersey

Texas A&M Transportation Institute

The World Bank

U.S. Department of Agriculture

VHB

Washington Metropolitan Area Transit Authority

WSP

Calendar and Fiscal Year 2021 Core Financial Support Provided by

- 91 Sponsor and Sustaining Global Affiliates
- 55 Organizational Affiliates from 10 nations
- More than 600 individual affiliates

APPENDIX C

TRB Webinars, Conferences, and Workshops

January 1–December 31, 2021

In-person conferences and workshops are noted with their location.

January

- 11, 14 Safe Transportation of Liquefied Natural Gas (LNG) by Railroad Tank Car Committee Meeting
- 13–15 International Symposium on Pavement, Roadway, and Bridge Life Cycle Assessment*
- 22, 25 Meeting: Committee on Options for Improving the Safety of Amphibious Vessels (DUKW Boats) When Used in Passenger Service
- 24–28 TRB 100th Annual Meeting
- 28–29 U.S. Coast Guard (USCG) Oversight of Recognized Organizations Committee Meeting
- 4 Bureau of Safety and Environmental Enforcement Inspection Report Briefing
- 4 TRB Webinar: Transportation Impacts in Managing Retreat from High-Risk Areas
- 5 USCG Oversight of Recognized Organizations Committee Meeting
- 8 Gulf Research Program Committee on Risk
- 8 TRB Webinar: Visualizing Effects of COVID-19 on Transportation: A One-Year Retrospective
- 10 TRB Webinar: Diversity in Airport Business Contracting and Workforce Programs
- 11 TRB Webinar: Concrete Overlays of Asphalt

February

- 2 TRB Webinar: Options for Reducing Lead Emissions from Piston-Engine Aircraft
- 3 TRB Webinar: Rock On—The Impacts of the Mischaracterization of Rock
- 4 TRB Webinar: Understanding Pavements—Long-Term Pavement Performance Program Updates
- 8 TRB Webinar: People Movers and Shakers—Quality of Life in Airport Communities
- 10 TRB Webinar: Driving Toward the Truth—Dispelling the Myths About Cannabis Products
- 17 TRB Webinar: Centering Seams—Maintaining Centerline Joints in Asphalt Pavements
- 18 TRB Webinar: A Two-Way Ticket—Collaborative Planning Among Airports & Public Agencies
- 22 TRB Forum on Automated Vehicles and Shared Mobility: State and Regional Department of Transportation (DOT) Perspectives on Connectivity
- 22 TRB Webinar: Using Artificial Intelligence to Predict Deterioration of Highway Bridges
- 22–25 Geosynthetics Conference*
- 25 TRB Webinar: Retrospective, Perspective, and Prospective of Transit-Oriented Development
- 26 USCG Oversight of Recognized Organizations Committee Meeting
- 15 Meeting: Committee on Options for Improving the Safety of DUKW Boats When Used in Passenger Service
- 15 TRB Webinar: Texting While Driving—Implications of Legislation on Electronic Devices
- 15–17 Advancing the Marine Transportation System Through Automation and Autonomous Technologies: Trends, Applications, and Challenges
- 16 TRB Webinar: The Ubiquitous Unmanned Aerial Vehicle—UAVs for Infrastructure Monitoring
- 18 TRB Webinar: Measuring Resiliency—Tools for Analyzing Resilient Transportation Systems
- 23 TRB Webinar: The New Virtual Reality for Public Meetings and Social Distancing
- 24 TRB Webinar: Emerging Challenges for Congestion Pricing on Managed Lanes
- 25 TRB Webinar: Analyzing Corridors and Systems with the Highway Capacity Manual
- 26, 30 USCG Oversight of Recognized Organizations Committee Meeting
- 30 TRB Webinar: Real-Time Response—A Pandemic Playbook for Public Transportation Agencies
- 31 TRB Webinar: Evaluating Tack Coat Materials’ Durability in Asphalt Pavements

March

- 2 TRB Webinar: Developing Airport Emergency Plans
- 3 TRB Webinar: Chemical Treatments on Low-Volume Roads

April

- 6–8 Measuring and Managing Freight System Resilience Workshop
- 7 TRB Webinar: Advances in Pavement Condition Surveys
- 8 TRB Webinar: Truck Assumptions for Roundabout Design

- 11–18 10th International Conference on Bridge Maintenance, Safety, and Management*
- 12 TRB Webinar: Technical and Sustainability Aspects of Lightweight Concrete Bridges
- 13 TRB Webinar: Minutes Matter—Bus Service Reliability
- 14 TRB Webinar: Geochemistry and Mineralogy in Chemical Soil Stabilization
- 19–21 International Transportation Finance Summit*
- 20–21 Joint Rail Conference*
- 20 TRB Webinar: The Day of the Drones—Airports and Unmanned Aircraft Systems, Part 1
- 21 TRB Webinar: Navigating Environmental Compliance for Public–Private Partnerships
- 22 TRB Webinar: Hydrodemolition for Bridge Rehabilitation
- 26 TRB Webinar: Paving the Way to Successful AASHTOWare Pavement ME Implementation
- 27 TRB Webinar: The Day of the Drones—Airports and Unmanned Aircraft Systems, Part 2
- 28 TRB Webinar: Strategically Implementing Transportation Security Measures
- 29 USCG Oversight of Recognized Organizations Committee Meeting
- 29 TRB Webinar: Washout! Infiltration-Caused Failure of Slopes Made of Plastic Clay
- 29–30 Research and Technology Coordinating Committee (RTCC) Meeting

May

- 6 TRB Webinar: Senior Leadership’s Role in Embedding Transportation Resilience
- 11–12 Research Day at the International Transport Forum Annual Summit*
- 12 TRB Webinar: Increasing Return on Investment through Geotechnology
- 13 TRB Webinar: How Ridehailing Companies Affect Airport Revenues and Operations
- 16–20 National Association of Environmental Professionals Annual Conference and Training Symposium*
- 17 TRB Webinar: Visualizing Transportation System Performance
- 18 TRB Webinar: Improving Transportation Access to Health Care
- 24–27 4th International Conference on Transportation Geotechnics*
- 24 TRB Webinar: Geotechnical Responses to Extreme Events
- 25 TRB Webinar: Drilled Shaft Design for Durability, Mix Stability, and Thermal Criteria
- 26–28 International Conference on Resource Sustainability: Sustainable Pavement Technologies*
- 26 TRB Webinar: Enhancing the Capacity for Transportation System Resilience

June

- 2 TRB Webinar: Not Easy Being Green—Colorizing Bicycle Lanes to Enhance Safety
- 3 TRB Webinar: Trust but Verify—Validating Contractor Test Data
- 7 Safe Transportation of LNG by Railroad Tank Car Committee Meeting
- 8 TRB Webinar: Catching Up on Low-speed Automated Vehicles in Public Transit
- 10 Gulf Research Program Committee on Risk
- 14 TRB Webinar: Redesigning Transit Networks for the New Mobility Future
- 15–19 World Transport Convention 2021*
Xi’an, China
- 16 TRB Webinar: Rapid Testing for Asphalt-Treated Cold Recycled Pavements
- 17 TRB Webinar: Casting Connections—Improving Performance and Durability of Steel Bridges
- 21–24 TRB Conference on Transportation Planning Applications
- 21 TRB Webinar: State and Local Deployments of Connected & Automated Vehicle Infrastructure
- 22 TRB Webinar: The Future of Bridge Foundation Designs with Artificial Intelligence
- 23–28 6th International Symposium on Highway Geometric Design*
- 23 TRB Webinar: Compost It! Environmental Benefits of Compost in Highway Roadside
- 28 TRB Webinar: Addressing Justice in Transportation
- 29 TRB Webinar: One Pack to Rule Them All—The Cone Penetration Test Expansion Pack
- 30–July 2 10th International Conference on Structural Health Monitoring of Intelligent Infrastructure*
Porto, Portugal

July

- 7 TRB Webinar: What is the True Cost of Infrastructure Assets Maintenance?
- 8 TRB Webinar: Asphalt Killers—Fatigue, Formulation, and Old Age in Binders
- 12, 14, 16, 19, 21 TRB Roadside Safety Design and AASHTO Roadside Safety Joint Committee Meeting
- 12–14 International Symposium on Frontiers of Road and Airport Engineering*
- 12–15 Automated Road Transportation Symposium 2021
- 15 USCG Oversight of Recognized Organizations Committee Meeting
- 16 Review of Federal Highway Administration Infrastructure R&D: Expert Task Group on Pavements
- 20 TRB Webinar: Are We All in the Same Boat? Involving Communities in Coastal Resilience

- 21 Review of Federal Highway Administration Infrastructure R&D: Expert Task Group on Bridges
- 21 TRB Webinar: Public Transit as a Climate Solution
- 26–28 Geospatial Data Acquisition Technologies in Design and Construction Summer Committee Meeting
- 26 TRB Webinar: Guidance for Setting Speed Limits
- 27 Review of Federal Highway Administration Infrastructure R&D
- 27 TRB Webinar: Staying Connected—Social Media and Airport Emergency Management
- 28 TRB Webinar: Using Drones to Inspect Bridges
- 29 TRB Webinar: Integrating Multimodal Fare Payments

August

- 3 TRB Webinar: Improving Pavement Geomaterial Performance with Unsaturated Soil Mechanics
- 4 TRB Webinar: Reducing Crashes Through Systemic Safety Analysis
- 5–6 Bridging Transportation Researchers Online Conference*
- 9 TRB Webinar: Lend a Helping Hand—Sharing Airport Data for Risk Management
- 10–12 National Conference on Transportation Asset Management
- 11–13 11th Pan-American Conference of Transport and Logistics 2021*
- 12 TRB Webinar: Road Passages and Barriers for Small Terrestrial Wildlife
- 16 TRB Webinar: Roadsides as Transportation Assets—Georgia Case Study
- 18 TRB Webinar: Changing the Manual to Support Deployment of Automated Vehicles
- 19 USCG Oversight of Recognized Organizations Committee Meeting
- 24–27 Highway Capacity and Quality of Service
- 25 TRB Webinar: Evaluating and Rating Unsurfaced Roads
- 26 TRB Webinar: Use and Design of Low-Density Cellular Concrete
- 30 Emerging Trends in Aviation Safety Committee Meeting
- 30 TRB Webinar: Fixing the Bump at the End of the Bridge
- 31 TRB Webinar: LED Roadway Lighting’s Effect on Driver Sleep Health and Alertness

September

- 2 TRB Webinar: A Guide to Joint Development for Public Transportation Agencies
- 8 TRB Webinar: Enter and Search Projects Like a Pro with Research in Progress Database
- 9–14 Conference on Advancing Transportation Equity
- 13–15 60th Annual Workshop on Transportation Law

- 13 TRB Webinar: Training Operations Personnel at Small Airports
- 14 TRB Webinar: Chip Seals, Microsurfacing, and Fog Seals Specifications
- 15 TRB Webinar: Evaluating the Performance of Retaining Walls and Embankments
- 16 Gulf Research Program Committee on Risk
- 21 TRB Webinar: Improving Bus Stops through Transit Agency Relationships
- 21–23 Innovations in Freight Data
- 27–Oct. 1 12th International Conference on Concrete Pavements*
- 27 TRB Webinar: Innovations in Using Vehicle Probe, Connected Vehicles, and Cellular Data
- 28 TRB Webinar: TRID and Reference Management Software
- 29 TRB Webinar: Implementing Airport Public–Private Partnerships
- 30 TRB Webinar: Ensuring Construction Quality Assurance with Light-Weight Deflectometers

October

- 5 Review of Federal Highway Administration Infrastructure R&D: Expert Task Group on Pavements
- 5 TRB Webinar: Workforce Management in Transportation
- 7 TRB Webinar: What’s Next for Integrated Corridor Management?
- 11–15 ITS World Congress*
Hamburg, Germany
- 12 TRB Webinar: Attention Employers! Cultivating Talent in the Airport Environment
- 12–14 Research-to-Practice Transit Symposium*
- 13 TRB Webinar: Changing Transportation System Technologies
- 14 TRB Webinar: Practical Perspectives on Alkali Silica Reactivity
- 18 TRB Webinar: That’s the Ticket! Evaluating Traveler Perspectives
- 19 TRB Webinar: Transportation Resilience Metrics
- 18–21 International Conference on Scour and Erosion*
- 20 Emerging Trends in Aviation Safety Committee Meeting
- 21 TRB Webinar: Air Quality Impact Models for Electric Vehicle Fleets
- 25–27 National Conference on Rural, Public, and Intercity Bus Transportation
- 26 TRB Webinar: Entrained Air-Void Systems for Durable Highway Concrete
- 27 TRB Webinar: Managing Equity in Priced Managed Lanes
- 27–29 Drug-Impaired Driving Conference
- 28 TRB Webinar: Designing and Implementing Smart Cities

November

- 1–5 Maritime Risk Symposium*
- 1–5 Conference on Transformative Times in Transportation Security
- 1 TRB Webinar: Building Information Modeling for Infrastructure
- 3 Navigating the Supply Chain Crisis
- 5 TRB Webinar: Ensuring a Productive TRB Annual Meeting Experience for All Young Attendees
- 7–10 Geo-Extreme Conference*
Savannah, Georgia
- 8 TRB Webinar: Giving Low-Volume Roads a Longer Life with Geosynthetics
- 9 TRB Webinar: Progress Toward More Resilient Pavements
- 15 TRB Webinar: Shovel Ready—Using Digital Terrain Models in Construction
- 16 TRB Webinar: Creature Comforts—Designing Terminal Restrooms and Ancillary Spaces
- 17 TRB Webinar: Hit the Ground Running—Designing Roundabouts with Conventional Pavement
- 18 TRB Webinar: Performance and Benefits of Metalizing and Duplex Coating

- 22 TRB Webinar: Pavement Maintenance Before Preservation
- 29 TRB Webinar: Paving the Way Toward Carbon-Neutral Concrete
- 30–
Dec. 1 Review of Federal Highway Administration Infrastructure R&D

December

- 1 TRB Webinar: Innovations in Bridge Foundation Load Testing and Data Integration
- 6 TRB Webinar: Power Up! Implementing an Airport Microgrid
- 7–9 International Workshop on Structural Health Monitoring*
Stanford, California
- 8–10 Virtual Accelerated Bridge Construction Conference*
- 9 RTCC Meeting
- 9 TRB Webinar: Examining Exclusions—What’s Missing in the Historic Review Process?
- 15 TRB Webinar: The Mighty River—Inland Waterway Resilience Analysis
- 16 TRB Webinar: Hit the Ground Running—Designing Roundabouts with Innovative Concrete Pavements

* TRB was cosponsor of the meeting.

APPENDIX D**Publications**

January 1–December 31, 2021

Transportation Research Record (online)

- 2675:1 Issue 1: January 2021
- 2675:2 Issue 2: February 2021
- 2675:3 Issue 3: March 2021
- 2675:4 Issue 4: April 2021
- 2675:5 Issue 5: May 2021
- 2675:6 Issue 6: June 2021
- 2675:7 Issue 7: July 2021
- 2675:8 Issue 8: August 2021
- 2675:9 Issue 9: September 2021
- 2675:10 Issue 10: October 2021
- 2675:11 Issue 11: November 2021
- 2675:12 Issue 12: December 2021

Special Reports¹

- 336 Options for Reducing Lead Emissions from Piston-Engine Aircraft
- 337 The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape
- 338 Modernizing the U.S. Offshore Oil and Gas Inspection Program for Increased Agility and Safety Vigilance
- 339 Preparing for LNG by Rail Tank Car: A Review of a U.S. DOT Safety Research, Testing, and Analysis Initiative
- 340 Investing in Transportation Resilience: A Framework for Informed Choices
- 341 Technical Feasibility of a Wheelchair Securement Concept for Airline Travel: A Preliminary Assessment

Transportation Research Circulars (E-Circulars) (online)

- E-C268 6th International Conference on Women's Issues in Transportation: Insight, Inclusion, and Impact: Framing the Future for Women in Transportation
- E-C269 2020 Commodity Flow Survey Workshop
- E-C270 Opportunities for Research on Transportation and Equity
- E-C271 Critical Issues in Aviation and the Environment 2021
- E-C272 Technology Exchange on Local Road Bridge Programs
- E-C273 TRB Centennial Circular: History and Future Perspectives on Foundation Design for Transportation Structures
- E-C274 Quality Assurance: Past, Present, and Future
- E-C275 Measuring and Managing Freight System Reliance Workshop

TR News Magazine

- 331 Challenges of Truck Size and Weight (January–February 2021)
- 332 2021 Virtual Event: TRB's 100th Annual Meeting (March–April 2021)

- 333 Diversity, Equity, and Inclusion in the Transportation Profession (May–June 2021)
- 334 Innovations on the Horizon: Research Needs for the Marine Transportation System of the Future (July–August 2021)
- 335 State of Emergency: What Transportation Learned from 9/11 (September–October 2021)
- 336 Collaboration and Innovation at MnROAD Research Facility (November–December 2021)

Online NewslettersTRB Transportation Research E-Newsletter/*TRB Weekly*²**Airport Cooperative Research Program (ACRP) Research Reports³**

- 220 Guidebook for Developing a Zero- or Low-Emissions Roadmap at Airports
- 225 Rethinking Airport Parking Facilities to Protect and Enhance Non-Aeronautical Revenue
- 226 Planning and Design of Airport Terminal Restrooms and Ancillary Spaces
- 227 Evaluating and Implementing Airport Privatization and Public–Private Partnerships
- 228 Airport Microgrid Implementation Toolkit
- 229 Airport Collaborative Decision Making (ACDM) to Manage Adverse Conditions
- 230 Enhancing Academic Programs to Prepare Future Airport Industry Professionals
- 231 Evaluating the Traveler's Perspective to Improve the Airport Customer Experience
- 232 Playbook for Cultivating Talent in the Airport Environment
- 233 Airport Biometrics: A Primer
- 234 Rapid Slab Repair and Replacement of Airfield Concrete Pavement

ACRP Synthesis³

- 115 Practices in Airport Emergency Plans

ACRP Legal Research Digests³

- 21 Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters as of December 31, 2019 (Update)
- 21 Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters as of December 31, 2020 (Update)
- 41 Legal Issues Relating to Airport Commercial Contracts
- 42 Legal Implications of Data Collection at Airports
- 43 Legal Considerations for Telecommunications at Airports

ACRP Web-Only Document (WOD)

- 51 Commercial Space Vehicle Emissions Modeling

ACRP WebResources

- 2 Airport Passenger Terminal Design Library, 2020 Updates
- 10 Periodic Publication on Transformative Technologies at Airports

National Cooperative Highway Research Program (NCHRP) Research Reports⁴

- 876 Guidelines for Integrating Safety and Cost-Effectiveness into Resurfacing, Restoration, and Rehabilitation (3R) Projects (and WOD 244)
- 948 Guide for Pedestrian and Bicyclist Safety at Alternative and Other Intersections and Interchanges
- 956 Guidebook for Data and Information Systems for Transportation Asset Management
- 957 Utilization Measurement and Management of Fleet Equipment
- 958 Electrochemical Test Methods to Evaluate the Corrosion Potential of Earthen Materials
- 959 Diverging Diamond Interchange Informational Guide, 2nd Edition
- 960 Proposed AASHTO Practice and Tests for Process Control and Product Acceptance of Asphalt-Treated Cold Recycled Pavements
- 961 Entrained Air-Void Systems for Durable Highway Concrete
- 962 Proposed Modification to AASHTO Cross-Frame Analysis and Design
- 963 A Pandemic Playbook for Transportation Agencies (joint with TCRP Research Report 225)
- 964 Protocols for Network-Level Macrotexture Measurement
- 965 Mitigation of Weldment Cracking in Steel Highway Structures Due to the Galvanizing Process
- 966 Posted Speed Limit Setting Procedure and Tool: User Guide (and WOD 291)
- 967 Asphalt Binder Aging Methods to Accurately Reflect Mixture Aging
- 968 LED Roadway Lighting: Impact on Driver Sleep Health and Alertness
- 970 Mainstreaming System Resilience Concepts into Transportation Agencies: A Guide (and WOD 293)
- 971 Revised Clear-Water and Live-Bed Contraction Scour Analysis (and WOD 294)
- 973 Long-Term Aging of Asphalt Mixtures for Performance Testing and Prediction: Phase III Results
- 974 Application of Crash Modification Factors for Access Management
 - Volume 1: Practitioner’s Guide
 - Volume 2: Research Overview
- 975 Transportation System Resilience: Research Roadmap and White Papers
- 976 Resilience Primer for Transportation Executives
- 978 Initiating the Systems Engineering Process for Rural Connected Vehicle Corridors
 - Volume 1: Research Overview
 - Volume 2: Model Concept of Operations
 - Volume 3: Model System Requirements Specification

- 980 Attracting, Retaining, and Developing the Transportation Workforce: Transportation Planners
- 983 Reliability of Crash Prediction Models: A Guide for Quantifying and Improving the Reliability of Model Results (and WOD 303)

NCHRP Syntheses⁴

- 560 Practices for Construction-Ready Digital Terrain Models
- 561 Use of Vehicle Probe and Cellular GPS Data by State Departments of Transportation
- 562 Repair and Maintenance of Post-Tensioned Concrete Bridges
- 563 Performance Metrics for Public–Private Partnerships
- 564 Practices for Selecting Pedestrian and Bicycle Projects
- 565 Maintenance and Surface Preparation Activities Prior to Pavement Preservation Treatments
- 566 Practices for Bridge Approach Systems
- 567 Summary State DOT Practices for Developing and Implementing TSMO Plans
- 568 Portland Cement Concrete Pavement Joint Sealant Practices and Performance
- 569 Practice and Performance of Cold In-Place Recycling and Cold Central Plant Recycling
- 570 Practices for Closing Out Highway Projects from Substantial Completion to Final Payment
- 572 Night and Weekend Movement of Oversize/Overweight Loads
- 573 Practices for Integrated Flood Prediction and Response Systems
- 574 Temporary Pavement Markings Placement and Removal Practices in Work Zones
- 575 Lighting Practices for Isolated Rural Intersections
- 576 Practices for Project-Level Analyses for Air Quality
- 577 Collaborative Practices for Performance-Based Asset Management Between State DOTs and MPOs

NCHRP Legal Research Digest⁴

- 84 Fix It, Sign It or Close It: State of Good Repair in an Era of Budget Constraints (joint with TCRP Legal Research Digest 57)

NCHRP Web-Only Documents

- 244 Developing Guidelines for Integrating Safety and Cost-Effectiveness into Resurfacing, Restoration, and Rehabilitation (3R) Projects (and Research Report 876)
- 286 Principles and Guidance for Presenting Active Traffic Management Information to Drivers
- 291 Development of a Posted Speed Limit Setting Procedure and Tool (and Research Report 966)
- 292 Roadside Hardware Replacement Analysis: User Guide
- 293 Deploying Transportation Resilience Practices in State DOTs (and Research Report 970)
- 294 Revised Clear-Water and Live-Bed Contraction Scour Analysis Training Manual (and Research Report 971)
- 295 Improved Prediction Models for Crash Types and Crash Severities
- 296 Guidelines for Cost-Effective Safety Treatments of Roadside Ditches

- 297 Intersection Crash Prediction Methods for the Highway Safety Manual
- 299 Investigating the Relationship of As-Constructed Asphalt Pavement Air Voids to Pavement Performance
- 300 Guidance to Predict and Mitigate Dynamic Hydroplaning on Roadways
- 302 Development of a Comprehensive Approach for Serious Traffic Crash Injury Measurement and Reporting Systems
- 303 Understanding and Communicating Reliability of Crash Prediction Models (and Research Report 983)
- 304 Criteria for Restoration of Longitudinal Barriers, Phase II
- 305 Validation of a Performance-Based Mix Design Method for Porous Friction Courses
- 306 Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges
- 307 Guidelines for the Selection of Test Levels 2 Through 5 Bridge Railings
- 309 Safety Performance of Part-Time Shoulder Use on Freeways
 - Volume 1: Informational Guide and Safety Evaluation Guidelines
 - Volume 2: Conduct of Research Report
- 310 Evaluation and Synthesis of Connected Vehicle Communication Technologies
- 311 Improving the Efficiency and Consistency of Section 106 Compliance for State DOTs: Strategies for Project-Level Programmatic Agreements
- 313 Selecting Ramp Design Speeds
 - Volume 1: Guide
 - Volume 2: Conduct of Research Report
- 314 Updating the AASHTO LRFD Movable Highway Bridge Design Specifications

Transit Cooperative Research Program (TCRP) Research Reports (online)

- 219 Guidebook for Deploying Zero-Emission Transit Buses
- 220 Low-Speed Automated Vehicles (LSAVs) in Public Transportation
- 221 Redesigning Transit Networks for the New Mobility Future: Resource and Toolkits
- 222 Analysis of Green Bond Financing in the Public Transportation Industry
- 223 Guidebook and Research Plan to Help Communities Improve Transportation to Health-Care Services
- 224 Guide to Joint Development for Public Transportation Agencies (and WOD 73)

- 225 A Pandemic Playbook for Transportation Agencies (joint with NCHRP Research Report 963)
- 226 An Update on Public Transportation’s Impacts on Greenhouse Gas Emissions
- 227 Prioritization of Public Transportation Investments: A Guide for Decision-Makers
- 228 Resource Guide for Improving Diversity and Inclusion Programs for the Public Transportation Industry
- 229 Assessing and Mitigating Electrical Fires on Transit Vehicles
- 230 Transit and Micromobility

TCRP Syntheses (online)

- 152 Transit Agency Relationships and Initiatives to Improve Bus Stops and Pedestrian Access
- 153 The Transit Analyst Toolbox: Analysis and Approaches for Reporting, Communicating, and Examining Transit Data
- 154 Innovative Practices for Transit Planning at Small to Mid-Sized Agencies
- 155 Intelligent Transportation Systems in Headway-Based Bus Service

TCRP Research Results Digest (online)

- 115 Use of Agency Service Agreements in ADA Paratransit Delivery

TCRP Legal Research Digests (online)

- 56 Joint Development Agreements Using FTA Funds or FTA-Funded Assets
- 57 Fix It, Sign It or Close It: State of Good Repair in an Era of Budget Constraints (joint with NCHRP Legal Research Digest 84)

TCRP Web-Only Document

- 73 Guide to Joint Development for Public Transportation Agencies: Appendices (and Research Report 224)

Behavioral Traffic Safety Cooperative Research Program Research Report

- 1 Using Electronic Devices While Driving: Legislation and Enforcement Implications

1 Available in print and online.
 2 Relunched as *TRB Weekly* in September 2021.
 3 Entire series available in print and online.
 4 Publications released since 2001 available in print and online.

APPENDIX E**TRB Staff**

As of December 2021

Executive Office

Executive Director, Neil J. Pedersen
Executive Assistant, Sierra Hall
Director, TRB Human Resources, Claudette Louard-Clarke
Administrative Assistant, Frances E. Holland
Associate Executive Director, Russell W. Houston
Director, Strategic Program Development, Patrice A. Davenport
Resident Scholar, Mark Norman

Committee Appointments and Report Review

Senior Report Review Officer, Karen S. Febey
Manager, Committee Appointments and Databases, Robert J. Summersgill

Communications and Distance Learning

Director, Communications/Media, Paul Mackie [Office of the Chief Communications Officer (OCCO)]
Distance Learning Program Coordinator, Elaine Ferrell (OCCO)
Content Strategist, Beth Ewoldsen (OCCO)

Information Technology and Research Services

Director, Lisa L. Loyo
TRB Software Engineer, Andrew T. Strassburg
Business Systems Analyst/HelpDesk Manager, Michael A. DeCarmine
HelpDesk-Business Systems Associate, Gareth E. Driver
Transportation Research Information Services Manager, William B. McLeod
Indexing Manager, Janet S. Daly
Database Librarian, Sam Saffer
Senior Librarian, Alexandra M. Briseno
Library Assistant, Shaakira Jackson

Technical Activities

Director, Ann M. Brach
Deputy Director, Director of Program Content, Stephen F. Maher
Senior Program Officers:
Data, Information, and Performance Management; Team Leader, Thomas M. Palmerlee
Maintenance and Preservation; Team Leader, James W. Bryant
Transportation Safety; Team Leader, Bernardo B. Kleiner
Aviation and Environment, Christine L. Gerencher
Legal Research, Robert J. Shea
Marine Transportation and Intermodal Freight; Marine Board Program Director, Scott Brotemarkle
Materials and Construction, Nelson H. Gibson
Policy and Organizations, Claire E. Randall
Public Transportation, Stephen J. Andrle
Rail and Freight, Scott Babcock
Social, Economic, and Policy, William B. Anderson
Soils, Geology, and Foundations, Nancy M. Whiting
Traffic and Operations, Richard A. Cunard
Program Officer—Planning and Analysis, Anusha Jayasinghe
Administrative Coordinator, Rosa P. Allen

Operations

Director of Operations, N. Christopher Rajaratnam
Operations Coordinators:
 Tess Austin
 Gary A. Jenkins
 Joanice L. Johnson
 Mary O. Kissi
 Rhonda Levinowsky
 Freda R. Morgan
 Ashley Vaughan

Meetings

Director, Meetings Department, Edward G. Leonardo
Deputy Director, Meetings Department, Bruce A. Millar
Senior Conference Manager, Megan E. Kaufmann
Conference Manager, Samantha Cid
Meetings Assistant, Kate Debelack

Publications and Outreach

Director of Publishing and Outreach, Managing Editor, Transportation Research Record (TRR) Journal, Patricia Ouellette Lockhart
Deputy Managing Editor, TRR Journal, John R. Dodson
Peer Review Production Coordinator, Kisna Quimby
Peer Review Coordinator and Publications Graphics Specialist, Amy Hardcastle
Communications, Outreach, and Web Specialist, Brie Schwartz

Consensus and Advisory Studies

Director, Thomas R. Menzies
Scholar, Stephen R. Godwin
Senior Program Officers:
 Lida Beninson
 Micah Himmel
 Mark S. Hutchins
 Katherine A. Kortum
 Noel Popwell
 Monica A. Starnes
 Melissa Welch-Ross
Program Officer, Brittany Bishop
Program Associate, Claudia Sauls
Program Coordinator, Timothy Marflak
Senior Program Assistant, Michael T. Covington

Administration and Finance**TRB Finance Service**

Senior Deputy Director, TRB Program Finance, Gary Walker [Office of the Chief Financial Officer (OCFO)]
Senior Finance Business Partners:
 Melissa N. Pickett (OCFO)
 Amy M. Przybocki (OCFO)
 Doris M. Romero (OCFO)
 Daniel R. B. Somerset (OCFO)
Finance Business Partners:
 Anthony T. Bailey (OCFO)
 Sophia T. Ramirez (OCFO)
 Shierra T. Ramirez (OCFO)
Senior Finance Assistant, G. Raymond McDaniel (OCFO)
Senior Contracts Receivable Analyst, Arun Khadka (OCFO)
Contract Manager, Dunyako Ahmadu (OCFO)

Publication Sales and Affiliate Services

Senior Membership Assistant, Kelvin R. Jordan
Supervisor, Publication Sales, Cydni Wolfinger

Cooperative Research Programs

Director, Christopher J. Hedges
Deputy Director and Manager, NCHRP, Lori L. Sundstrom
Associate Program Manager, NCHRP, Waseem Dekelbab
Manager, TCRP, Gwen Chisholm Smith
Manager, ACRP, Marci A. Greenberger
Director of Publications, Natalie Barnes
Associate Director of Publications, Heather DiAngelis
NCHRP Implementation Coordinator, Sid Mohan

Senior Program Officers:

Ahmad Abu-Hawash
Velvet Basemera-Fitzpatrick
Jordan Christensen
Camille Crichton-Summers
Zuxuan Deng
Mariela Garcia-Colberg
Jo Allen Gause
Matthew J. Griffin
Amir N. Hanna
Edward T. Harrigan
Ann M. Hartell
Leslie Harwood
David Jared
Inam Jawed
Andrew C. Lemer
Christopher McKenney
Joseph D. Navarrete
Stephan A. Parker
Richard A. Retting
Theresa H. Schatz
Dianne S. Schwager
Trey J. Wadsworth
Jennifer L. Weeks

Administrative Coordinator, Joseph J. Snell

Associate Program Officer, Sarah Kosling
Administrative Associate, Cynthia E. Butler
Program Associate, Sheila A. Moore

Program Coordinators:

Emily Griswold
Deborah Irvin
Brittany Summerlin-Azeez

Travel Specialists:

Daniel J. Magnolia
Robert Turner

Senior Program Assistants:

Anthony P. Avery
Stephanie L. Campbell
Cheryl Keith
Thu M. Le
Jarrel McAfee
Tyler Smith
Hana Vagnerova
Demisha Williams

Publishing Projects Manager, Jennifer J. Weeks

Senior Editors:

Lea Camarda
Ellen M. Chafee
Linda A. Dziobek
Doug English
Cassandra J. Franklin-Barbajosa
Hilary Freer
Margaret B. Hagood
Scott E. Hitchcock
Janet M. McNaughton

Editors:

Kami Cabral
Sreyashi Roy
Lisa Whittington

Assistant Editors:

Jennifer G. Correro
Kathleen Mion

Systems Analyst, Roy N. Mesler

Stock photo credits

Cover (left to right, top to bottom)

- Alvarez/iStock
- RyanJLane/iStock
- RichLegg/iStock
- Extreme-Photographer/iStock
- MarioGuti/iStock
- Spooh/iStock
- BCFC/iStock
- Pgiam/iStock
- 1 Orbon Alija/iStock
- 2 Phillyskater/iStock
- 3 Grandriver/iStock
- 6 GeorgeClerk/iStock
- 8 KenWiedemann/iStock
- 9 Zview/iStock
- 11 Gilmanshin/iStock
- 12 Mlenny/iStock
- 13 Prykhodov/iStock
- Izusek/iStock
- 14 lam Anupong/iStock
- 16 Alex Potemkin/iStock
- 17 Lavin Photography/iStock
- 18 Boogich/iStock
- 19 Ollie Desforges/iStock
- 20 Narvikk/iStock



The National Academies of
SCIENCES • ENGINEERING • MEDICINE

The nation turns to the National Academies of Sciences, Engineering, and Medicine for independent, objective advice on issues that affect people's lives worldwide.

www.nationalacademies.org