MIT Mobility Initiative

Annual Report
2024-25

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Letter from the Executive Director's Desk

The MIT Mobility Initiative demonstrates how a small team can accomplish big things. By leveraging our communities of industry leaders, scholars, technologists, financiers and graduate students, the MMI acts as a global resource in service of our mission to move the world toward a mobility system that is safe, clean and inclusive.

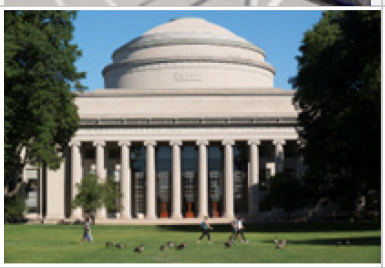
Our accomplishments for 2024-2025 include:

- Expanding our research portfolio to address important mobility challenges.
    - We completed research on topics ranging from vehicle performance and weight trends to estimating computing energy consumption for autonomous vehicles to the value of public transit systems.
    - We launched our MMI Automotive Strategy and Technology (MAST) consortium, an industry community that explores the intersection of business strategy and technology in critical automotive areas and recently completed our first report on Software Defined Vehicles.
    - In partnership with the Kearney Advanced Mobility Institute, we launched a research program to explore the impact of AI in Mobility.
    - In partnership with Gensler, we continued our work on the carbon impact of commuting and working from home/office/3rd place.
- Hosting our 4th annual MMI Vision Day at the US Department of Transportation's Volpe National Transportation System Center, convening 130 mobility leaders in our "hyper-interactive" format to shape a better mobility future.
- Delivering the 5th year of the MMI Mobility Forum, our on-line weekly forum that invites the greatest thinkers in the world of transportation to share their ideas in an open-to-the-public discussion forum.
- Teaching MIT Mobility Ventures, a joint DUSP-Sloan graduate-level course that explores the intersection of transportation and entrepreneurship with an array of founders and CEOs who share their insights directly with students.
- Publishing the research briefings of first cohort of MMI Senior Fellows, a unique group of carefully selected industry and government leaders who share their insights with our community, and welcoming the second cohort that includes two former Secretaries of Transportation and the founder of a leading venture capital firm
- Welcoming our second cohort of MMI Visiting Students, carefully selected PhD students from universities around the world, to come to MIT and contribute to our research portfolio
- Launching new initiatives, such as hosting an event to convene key mobility leaders from the San Francisco Bay Area and creating a tailored on-line education program for the US National Highway Traffic Safety Administration (NHTSA).

These accomplishments, built on a solid foundation established since the MMI was founded by Prof. Jinhua Zhao in 2020, are notable, especially in light of the highly volatile business climate and profound geopolitical trends reshaping the mobility industry. Looking forward, the MMI will continue to leverage our various mobility-focused communities to lead the transition to safe, clean and inclusive mobility systems.

Mission and Pillars

Our Mission
The MIT Mobility Initiative (MMI) is a global platform to accelerate a safe, clean and inclusive mobility system through research, education, entrepreneurship and engagement

Research		Catalyze cross-disciplinary research that provides insight to strategic challenges for industry and society
Education		Manage and enhance MIT's transportation degree programs and expand the executive education offering
Entrepreneurship		Leverage MIT's innovation ecosystem to spin off mobility tech startups and support existing startups
Engagement		Foster direct interaction with leaders from business and government on the "front lines" of the mobility revolution

MMI – By the Numbers

18,000+ Mobility Initiative Subscribers
10 MMI Research Projects Completed
150 Mobility Forum Sessions Conducted
250+ Mobility Forum Attendance per Episode
6 New MMI Members added in 2024-25
4 Annual Mobility Vision Days Hosted

Mobility Vision Day 2024

Launched in 2021, the MMI Vision Day is a hyper interactive full-day invitation event to showcase MMI research findings and discuss strategic shifts in all aspects of mobility with business and government leaders.

October 25, 2024, was the 4th Vision Day and amongst our largest with more than 130 in-person senior leaders from industry, academia and government. All attendees had been carefully chosen to represent key perspectives and actively engage in an event with a clear purpose: to identify today's most pressing mobility challenges and develop a research agenda that can help move today's mobility system towards a future that is safe, clean, and inclusive. For 2024 we were hosted by the US Department of Transportation at **The John A. Volpe National Transportation Systems Center** in Cambridge, Massachusetts.

The Mobility Vision Day 2024 was structured around participant discussions interspersed with expert panels and lightning briefings. Attendees were encouraged to rotate tables throughout the day to engage with stakeholders from across the spectrum.

This year we had the honor of MIT President Sally Kornbluth kick start the event. The day was a mix of Panel Discussions, Special Guest Keynotes, Roundtable Discussions and Lightning Briefings. Topics ranged from Public Transit, Transport Infrastructure, Mobility Trends of 2024, Mobility Electrification, Mobility Finance, Autonomous Mobility. Road Safety and Why Mobility Matters. The detailed agenda can be seen on the following page.

Welcome to the 4th MIT Mobility Initiative Vision Day • John Moavenzadeh, Executive Director, MIT Mobility Initiative • Steve Popkin, Director, Research & Innovation Technology, Volpe Center	
Mobility, AI, Climate and Health: The MIT Perspective • Sally Kornbluth, President, Massachusetts Institute of Technology • Jinhua Zhao, Founder and Faculty Director, MIT Mobility Initiative	
Special Address: USDOT • Robert Hampshire, Principal Deputy Assistant Secretary, US Department of Transportation	
Panel: Public Transit in the Second Quarter of the 21st Century • Frances Cooperman, Chief Marketing Officer, Via • Deanna Martin, Chief of Staff, King County Metro • Jonathan Rewers, Chief Strategy Officer, San Francisco MTA • Lauren Sager Weinstein, Chief Data Officer, Transport for London • *Moderated by Jim Aloisi, Senior Lecturer, MIT*	

Lightning Briefings: Transportation Infrastructure and the Built Environment • Transit Oriented Development - Dylan Jones, Mobility & Transportation Lead Principal, Gensler • AI Agents & Road Network Operation - Dimitris Bountolos, Chief Information and Innovation Officer, Ferrovial • Rethinking How We Build - Shailen Bhatt, SVP and Chief Operating Officer, US & LATAM, AtkinsRealis • Finally Realizing the Promise of ITS - Laura Chase, President and Chief Executive Officer, ITS America • *Reactions and Reflections from: Victoria Sheehan, Executive Director, Transportation Research Board*	
Gen AI in Autonomous Mobility: Shifting to AV2.0 • Raquel Urtasun, Founder & Chief Executive Officer, Waabi • Xiaodi Hou, Founder and Chief Executive Officer, bot.auto • Henry Liu, Director, MCity, and Professor, University of Michigan • *Moderated by Jinhua Zhao, Founder and Faculty Director, MIT Mobility Initiative*	
Lightning Briefings: Electrification Ecosystem • Reliability of EV Charging Infrastructure - Kameale Terry, Founder and Chief Executive Officer, ChargerHelp! • Opportunity of Microgrids for Mobility - Juan Macias, Chief Executive Officer, AlphaStruxure • Curbside Charging in the City of Boston - Tiya Gordon, Co-Founder and Chief Operating Officer, itselectric • School Bus Electrification - Duncan McIntyre, Founder & Chief Executive Officer, Highland Electric Fleets • Fleet Charging - Joshua Aviv, Founder & Chief Executive Officer, SparkCharge • Building Mobility Innovation Capacity - Jamey Tesler, Executive Director, Mass Mobility Hub	

MMI Research Briefings

- Equity Implications of Drone Delivery Systems - Hamsa Balakrishnan, Professor, AeroAstro, MIT
- EV Urban Charging Optimization: A Case Study at Michigan Central - Alexandre Jacquillat, Associate Professor of Operations Research and Statistics, MIT
- Community-Centered Digital Infrastructure Development - Dajiang Suo, Assistant Professor, Arizona State University
- Trends in Vehicle Acceleration and Braking - Bhuvan Atluri, Associate Director of Research, MIT Mobility Initiative

Lightning Briefings: Road Safety

- Truck Blind Zones and Vulnerable Road Users - Kris Carter, Chief Possibility Officer, MassDOT
- Car Bloat and Vulnerable Road Users - David Zipper, MIT Mobility Initiative Senior Fellow
- State of Distracted Driving and Future of Road Safety - Matt Fiorentino, VP of Marketing, Cambridge Mobile Telematics

Geopolitics and Industrial Policy: Lightning Briefings

- From Scary to Dominant: China's Relentless Drive Forward - Benjamin Qiu, Partner, Elliott Kwok Levine & Jaroslaw

Panel: Mobility Finance: Where Will the Money Come From? • Reilly Brennan, Co-Founder and General Partner, Trucks VC • Patrick Steinemann, Managing Director and Head of Mobility, Bank of America • Chris Thomas, Founder & Partner, Assembly Ventures • Libby Wayman, Partner, Breakthrough Energy Ventures - • *Moderated by Laura Fox, Co-Founder and Managing Partner, Streetlife Ventures*	
MMI Senior Fellows Briefing • Deploying Non-Dilutive Capital to Scale Early-Stage Urban Mobility - Laura Fox, Senior Fellow, MIT Mobility Initiative • Scaling Venture Capital and Government Investment in Micromobility - Alex Mitchell, Senior Fellow, MIT Mobility Initiative • Marketing Electric Vehicles: Which Metrics Make Sense? - David Zipper, Senior Fellow, MIT Mobility Initiative	
Access: Why Mobility Really Matters • Janine Dawkins, MLK Visiting Scholar, MIT • Karla Gonzalez Carvajal, Infrastructure and Policy, World Bank • Hala Hanna, Managing Director, MIT Solve • Emily Young, Co-Founder and Chief Executive Officer, Moving Health • *Moderated by John Moavenzadeh, Executive Director, MIT Mobility Initiative*	

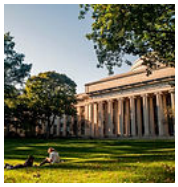
Photos and Slides from the event can be viewed on MIT Mobility Initiative website here.

Mobility Forum - Fall 2024 and Spring 2025

The MIT Mobility Forum hosted by Prof. Jinhua Zhao showcases transportation research, trends and mobility innovations across the globe. The Forum is hosted on Fridays between 12 - 1PM ET during the fall and spring terms, is fully online and open to the public. Audience Participation has grown over the years and the last 2 editions saw an average of 250 attendees join each session. Speakers present for the first half of the forum, followed by a moderated audience Q&A. The subscription to the MIT Mobility Initiative mailing list has organically grown to over 18,000 (4000 over the last year). All the sessions are recorded and the recordings and slides are uploaded and available at https://www.mmi.mit.edu/forum for the benefit of the community.

Fall 2024	
	**Bringing Generative AI to the Physical World : Insights from Waabi** - Watch Video Raquel Urtasun CEO, Waabi
	**Transportation Megaprojects: Global Hits and Misses** - Watch Video John Landis Professor Emeritus of City & Regional Planning, University of Pennsylvania
	**Reflections on the Growing Field of Transport and Health** - Watch Video Daniel Rodriguez Chancellor's Professor of City & Regional Planning, UC Berkeley
	**Public Transit is an Investment not a Cost: Perspectives from UITP** - Watch Video Mohamed Mezghani Secretary General, International Association of Public Transport (UITP)

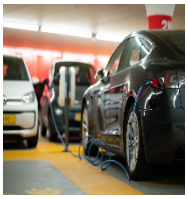
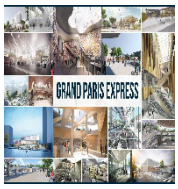
	**LiDAR and Photonics in Transportation** - Watch Video Jelena Notaros Robert J. Shillman (1974) Career Development Professor in Electrical Engineering and Computer Science, MIT
	**Safety Assessment for Autonomous Vehicles** - Watch Video Henry Liu Director, Mcity Bruce D. Greenshields Collegiate Professor of Engineering University of Michigan, Ann Arbor
	**Machine Learning Applications in Land Use and Travel Behavior Analysis** - Watch Video Jason Cao Professor, Humphrey School of Public Affairs, University of Minnesota
	**Autonomous Mobility** - Watch Video Jinhua Zhao; Raquel Urtasun; Henry Liu; Xiaodi Hou Faculty Director, MIT Mobility Initiative; CEO, Waabi; Professor of Engineering, University of Michigan, Ann Arbor; Founder & CEO, BOT.auto
 	**Vehicle Performance Trends and their Safety Implications** - Watch Video Bhuvan Atluri & John Moavenzadeh Associate Director of Research & Executive Director, MMI
 	**Five Recommendations for Incoming Transportation Leadership** - Watch Video Stephen Zoepf & Beth Osborne Former Chief Analyst, OST-R, USDOT & Director, Transportation for America
	**Sustainable Batteries for Mobile Applications** - Watch Video Mircea Dinca W. M. Keck Professor of Energy, MIT

	**The Future Takes Shape** Tom O'Leary Co-Founder, JetZero
	**MMI Senior Fellows Presentation** - Watch Video Alex Mitchell, David Zipper, Laura Fox MMI Senior Fellows
	**The Dilemma of Transport Planning and a Possible Alternative Urban Vision** - Watch Video Kay Axhausen Professor for Transport Planning, ETH Zürich

Spring 2025

	**Preparing For Battery Electric Bus Public Transport: Modeling Tools And Implementation Decision Making Support** - Watch Video Constantinos Antoniou Chair of Transportation Systems Engineering, Technical University of Munich
 	**The Role Of Transportation Infrastructure In The Future Of Connected And Automated Vehicles** - Watch Video Jen Duthie | Prof. Dan Work Head of Innovation, Cintra | Professor of Civil and Environmental Engineering, Vanderbilt University
 	**Automating Ports: Technology Frontier and Industry Application** - Watch Video Heidi Wyle | Daniela Rus CEO & Founder, Venti Technologies | Professor of Electrical Engineering and Computer Science and Director of the Computer Science and Artificial Intelligence Laboratory (CSAIL), MIT

	**Going Nowhere Fast: Dissecting the Remarkable Fall of U.S. Personal Travel in the 21st Century** - Watch Video Brian Taylor Professor of Urban Planning and Public Policy, Research Fellow in the Institute of Transportation Studies at UCLA
	**2025 UP.Partner's Moving World Report** - Watch Video Adam Grosser Chairman and Managing Partner, UP Partners
	**Cities, Transit and the Future of Working from Home** - Watch Video Nick Bloom Professor of Economics, Stanford University
	**Congestion Pricing in New York City: 'If you can make it there, can you make it anywhere?'** - Watch Video Sam Schwartz (Gridlock Sam), Will Carry, Matt Daus Former NYC Traffic Commissioner | Assistant Commissioner for Policy at NYC Department of Transportation | Partner & Chair, Transportation Practice Group at Windels Marx
 	**Creating the Mobility Innovation Ecosystem: The State and Private Sector Role** - Watch Video Stephanie Pollack | Jamey Tesler Former Secretaries of Transportation for Massachusetts and MMI Senior Fellows 2025
	**The New Lunar Society: An Enlightenment Guide to the Next Industrial Revolution** - Watch Video David Mindell Professor of Aeronautics and Astronautics, MIT
	**MIT Mobility Forum sub-series: Women in Transportation Tech** - Watch Video Hyun-A Park | Sampriti Bhattacharya | Robin Chase | Kristin White President, Spy Pond Partners, LLC | Founder & CEO, Navier | Founder & Former CEO, Zipcar | Head of Transportation Strategy & Partnerships, Google

	**EV in a Fractured World: US-China Trade War and Global Auto Industry** - Watch Video John Moavenzadeh | Jinhua Zhao | Jack Ewing Executive Director, MIT Mobility Initiative | Founder & Faculty Director, MIT Mobility Initiative | Business Reporter, New York Times
	**Optimizing Mixed-Autonomy Traffic: Machine Learning for Energy-Efficient CAV Control** - Watch Video Alexandre Bayen Professor of Electrical Engineering and Computer Science, and Civil and Environmental Engineering, UC Berkeley
	**The Grand Paris Express** - Watch Video Bernard Cathelain | Pierre-Emmanuel Becherand Executive Board Member, Grand Paris Express | Head of Design, Arts and Urban Development, Grand Paris Express
	**Will EVs Break the Power Grid?** - Watch Video Scott Moura Professor of Civil and Environmental Engineering, UC Berkeley and Director of the California Program for Advanced Transportation Technology (PATH)
	**The Intricacies of Mobility & Movement Data** - Watch Video Alexei Pozdnoukhov | Paul Friedman | Ralf-Peter Schäfer Co-Founder and Chief Scientist, Replica | Co-Founder and CTO, StreetLight Data | VP of Product Management Traffic and Travel Information, TomTom
	**Unconventional Electrification** - Watch Video Ali Javidan | Som Ray | Tom Gurski CTO & Founder, Range Energy | CEO & Founder, CLIP | CEO & Founder Blue Dot Motorworks

Other Events

Aug 2024 – Michelin Workshop	MMI conducted a half day workshop for senior global executives from Michelin at MIT on Aug 26th 2024.
Aug 2024 MMI Members Meeting	Our Summer 2024 hybrid MMI Members Meeting was held on August 30th with 25 participants. The agenda can be seen here and the participant list can be found here.
Oct 2024 MMI Members Meeting - Our Winter 2023 in-person MMI Members Meeting was held on Oct 24th with 30 participants. The agenda can be seen here and the participant list can be found here.	. 
Nov 2024 Advisory Board Meeting	Our 3rd meeting for 2024 of the MMI Advisory Board was held on November 7th, 2023, with participation from 5 out of the 8 board members.
Nov 2024, MIT Research and Development Conference	Jinhua Zhao and John Moavenzadeh from the MMI presented the current trends in mobility to an engaging audience at the ILP Research & Development Conference on November 19th, 2024.
Sep - Dec 2024 NHTSA (National Highway Traffic Safety Administration) Seminar Series	MMI in participation with other MIT faculty conducted 3 seminars on current mobility & transportation topics for NHTSA staff between Sep – Dec 2024. This was the second installment of these sessions. Over 80 attendees were present at each of the virtual sessions. The 3 sessions were 1. Sep 17, 2024 – Vehicle Performance Trends & their Safety Implications – Bhuvan Atluri & John Moavenzadeh 2. Nov 26, 2024 – The Future of Public Transit – Jim Aloisi 3. Dec 16, 2024 –The Value of Car Ownership – Jinhua Zhao

Jan 2025 MMI Transportation Research Board (TRB) Reception at Washington DC. An annual MMI tradition, the Jan 2025 reception during the TRB conference saw over 250 attendees.	
April 2025 – San Francisco Mobility Tech Dinner - MMI hosted a dinner on 3rd April 2025, for over 30 mobility startup founders and VCs in San Francisco.	
April 2025	MMI convened a full-day in-person workshop at MIT with the 2025 MMI Senior Fellows cohort on April 16th, 2025.
May 2025 MMI Members Meeting	Our Summer 2025 in-person MMI Members Meeting was held on May 2nd with 25 participants. The agenda can be seen here.

Mobility Ventures Fall 2024

Launched in Fall 2020 by the MMI this course is designed for students who aspire to shape the future of mobility. This graduate level course offering at MIT explores technological, behavioral, policy and systems-wide frameworks for innovation in transportation systems, complemented with case studies across the mobility spectrum, from autonomous vehicles to urban air mobility to last-mile sidewalk robots.

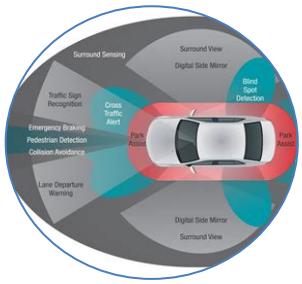
Students interact with a series of guest lecturers from CEOs and other business and government executives who are actively reshaping the future of mobility. Interdisciplinary teams of students collaborate to deliver business plans for proposed mobility-focused startups with an emphasis on primary market research. The course has steadily grown in popularity and class size for Fall 2024 consisted of 29 Students from MIT Sloan, DUSP, MIT Engineering, Harvard Kennedy School & Harvard GSD.

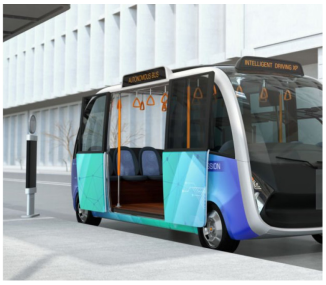
Guest Speakers over the years include:

Daniel Ramot, Co-Founder & CEO, Via Transportation
R.J Scaringe, CEO, Rivian Automotive
Kameale C. Terry, Co-Founder & CEO, ChargerHelp!
John De Souza, co-Founder & President, Ample Inc.
Tiffany Chu, Chief of Staff, City of Boston
Tiya Gordon, Co-Founder & COO, itselectric
Billy Thalheimer, Co-Founder & CEO, Regent Craft
Mujeeb Ijaz, Founder & CEO, Our Next Energy (ONE)
Joshua Avid, Founder & CEO, SparkCharge
Alex Wallar, Co-Founder & CTO, The Routing Company
Kei Onishi, CEO & MD, Yamaha Motor Ventures
Libby Wayman, Partner, Breakthrough Energy Ventures
Chetan Maini, Founder & CEO, Sun Mobility
Michael Granoff, Founder & Managing Partner, Maniv Mobility
Xiaodi Hu, Founder & CEO, BOT Auto

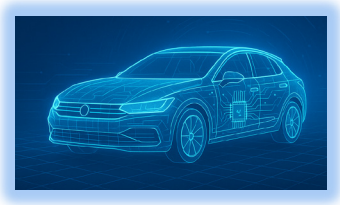
MMI Research Projects

New Projects Launched and their Core Research Questions

	**Transit Research Consortium – Fare Nonpayment** Alyssa Papantonakis, Jim Aloisi	1. What are the behavioral drivers for riders to skip fare payment? How does this differ from the agency's perspective? 2. What are the associated costs and burden for agencies? 3. What are the available levers and tools for agencies, and how effective are they?
	**AI in Mobility** Marvin Greifenstein, Bhuvan Atluri, Jinhua Zhao, Kearney Advanced Mobility Institute	1. What are the most promising AI applications in the mobility industry? 2. What is the potential value creation of AI for the mobility industry? 3. How can AI contribute to Clean, Safe and Inclusive mobility systems?
	**MMI Automotive Strategy & Technology Consortium (MAST)**	1. Launched in June 2024 the mission of the MAST consortium is to provide a resource for strategy and technology executives at automotive-related companies (OEMs, Tier-1s, related ecosystem) to explore future scenarios and technology trajectories 2. The first topic chosen for a research briefing paper was "Software Defined Vehicles"

	**DOE Research Project in Chicago: M-CATS** MIT, Northeastern, University of Florida	1. Develop a seamless hierarchy of three service regimes mixed dynamically based on demand a. door-to-door demand-responsive transit (DRT) b. fixed-route with deviations c. fixed-route services 2. On-ground pilot in cooperation with the Chicago Transit Authority & Illinois Medical District
	**NYC Congestion Charging Report** ChenAn Shen Xinyi Huang Yunlin Li Bhuvan Atluri Jinhua Zhao	1. To assess how the volume, routing, flow, congestion, and composition of vehicular traffic has changed since the introduction of congestion pricing. 2. To evaluate the changes to public transit use and performance, as well as systemic safety and environmental outcomes. 3. To infer and interpret modal shifts, trip suppression, route reallocation, business and other economic impacts.
	**AV Deployment in Urban Settings: Building the Toolkit** Jinhua Zhao Jim Aloisi Awad Abdelhalim Bhuvan Atluri	1. What is the business case? What is the long-term sustaining case for profitability consistent with the public interest case? 2. How can AV support the public interest in PM and GHG emissions reductions, redesigned safe streets (accommodating multi modal uses), targeted agglomeration of job growth clusters, mobility that enhances, rather than replaces, urban transit and personal active mobility and last mile modal connectivity.

Completed Projects and their Key Findings

Vehicle Performance Trends & Implications for Safety Bhuvan Atluri Aaron Zhu **Final Report** 	1. The gap in braking performance (70mph - 0 in feet) of SUVs/pickup trucks versus the rest of the LDV fleet gets worse as the acceleration (0 - 60mph in seconds) gets faster and heavier. 2. BEVs on average accelerate much faster from 0 - 60 mph compared to other LDVs but do not have comparable braking performance; this gets amplified when looking at the top 50 percentile of accelerating BEVs. **3.** With the LDV fleet comprising more SUVs/pickup trucks today and BEVs in the future, the combination of inadequate braking coupled with faster acceleration and heavier weight can considerably worsen road safety.
Calculating the Carbon Footprint of Work **Final Report** Gensler Research Institute Bhuvan Atluri John Moavenzadeh 	1. Shared transit and work infrastructure is more energy efficient than private cars and private homes 2. Depending on the city and commute mode, as well as if the home is left empty and temperature setback during the workday - this reduction in energy use has the potential to avoid far more carbon than is emitted by commutes and office operations. 3. This research provides a framework and tools to understand trade-offs between different working profiles, focusing on how our behavior choices and travel patterns affect net carbon emissions
Software Defined Vehicles Research Briefing Gauri Tike Bhuvan Atluri John Moavenzadeh **Final Report** 	1. For OEMs, SDVs provide opportunities to save costs, reduce complexity, and offer differentiation to consumers through unique services and the transformation of business models, leveraging AI and deep learning technologies 2. For end customers, SDVs offer post sale personalization, continuous updates, enhanced safety features, and personalized/connected services, akin to the evolution from feature phones to smartphones. 3. Challenges such as cybersecurity, hardware compatibility, liability, cost, organizational inertia, data privacy, and long-term value creation remain key obstacles that must be overcome via collaboration between OEMs/Tier-1 suppliers and the use of open-source tools for non-differentiating layers.

MMI Transit Research Consortium (TRC) - The Value of Transit - Chicago Seamus Joyce-Johnson Jim Aloisi **Final Report** 	1. Public Transit is critical to mobility, economy and equity. Simulating a scenario where the Chicago Transit Agency cuts service, we find that: a. Vehicular traffic speed in the city would go down by 33% and travel time would shoot up by 35%. b. 2 Million trips would be cancelled daily – disproportionately higher share by Women and low income travelers. *c.* Every $1 invested in Public Transit can give a $13 boost to the overall Great Chicago Metro Area Economy – a 13X RoI.
Autonomous Mobility Computing Energy Sertac Karaman Vivienne Sze **Final Report** 	1. The compute cost of autonomous driving systems, while still significant, can be reduced by at least two orders of magnitude using custom chips designed for the purpose. Two methods presented here include: • A new Gaussian splatting-based SLAM system that is able to reduce memory overhead of the system by 94x • A new way to train a monocular depth DNN on the fly, which will allow one to reduce the compute cost while still maintaining accuracy
2024 MMI Senior Fellows Research Briefing  	1. Scaling Private Sector Investment in and Government Support for Micromobility in the US - Alex Mitchell 2. Marketing Electric Vehicles: Which Metrics Make Sense? - David Zipper 3. Non-Dilutive Capital for Mobility Startups - Laura Fox

MMI Community

2025 MMI Senior Fellows

The MIT Mobility Initiative announced its second cohort of 5 MMI Senior Fellows for 2025 in January 2025 after a comprehensive application process which received 44 submissions. The MMI Senior Fellows program enables a select group of accomplished individuals with unique insights and professional experience to:

1.) Engage with and contribute to the Mobility Initiative and the broader MIT community during the course of this year

2.) Produce a research briefing that addresses a timely and important research question aligned with our mission to accelerate safe, clean, and inclusive mobility.

Adam Grosser

Adam brings a long history of successful involvement in seminal Silicon Valley companies. Adam is currently the Chairman & Managing Partner of UP Partners. Previously, Adam was a Managing Director at Silver Lake Partners for 11 years. At Silver Lake he oversaw successful investments in Tesla (TSLA), Solar City (SCTY), Hyla Mobile (Assurant), Quorum (Thoma Bravo), and Aras (GI Partners). Until recently, he served on the boards of Aeva (AEVA), Calix (CALX), EnerNoc (ENOC), Conviva, Control4 (CTRL), Sentient Energy (Koch), SiBEAM (SIMG), Silver Spring Networks (SSNI), and Transmedics (TMDX).

Before SilverLake Kraftwerk, Adam was a General Partner at Foundation Capital for 10 years and was named to Forbes Midas List 4 times. Prior to joining Foundation Capital, Adam was President of Excite@Home, which encompassed thousands of people across multiple divisions. Before @Home, Adam was the co-founder, President and CEO of Catapult Entertainment from inception through IPO. Before his startup life, Adam held leadership positions with technology innovators Apple Computer, Lucasfilm, and Sony - in engineering and management.

Adam builds boats and planes, bikes avidly if slowly, and kitesurfs at every opportunity. Adam holds BA, MS and MBA degrees from Stanford University. He is a Senior Fellow at the American Leadership Forum, and was recently awarded an Edmund Hillary Fellowship from the government of New Zealand. Adam is married, with two (amazing) daughters, and two poorly behaved Labradoodles.

Kara Kockelman

Dr. Kara M. Kockelman is the Dewitt Greer Professor of Transportation Engineering in the Department of Civil, Architectural, and Environmental Engineering at The University of Texas at Austin. She earned her B.S. in Civil Engineering in 1991, her M.S. in Civil Engineering and M.C.P. in City and Regional Planning in 1996, and her Ph.D. in Civil Engineering in 1998, all from the University of California, Berkeley.

Dr. Kockelman's research encompasses a wide array of topics, including travel demand modeling, the impacts of self-driving vehicles, energy and greenhouse gas emissions, and traffic safety analysis. She has published extensively in these areas, contributing significantly to the field of transportation engineering.

Throughout her career, Dr. Kockelman has received numerous accolades, including UC Berkeley's Medal, MIT Tech Review's Top 100 (young) Innovators Award, a Google Research Award, an NSF CAREER Award, 4 national ASCE awards, and CUTC's inaugural New Faculty Award. She has served as the president of the North American Regional Science Council, chaired the TRB Travel Survey Methods Committee and UT Austin Faculty Women's Organization, and has been co-organizing the world's only cost-free carbon-free transportation research conference for 7 years (bridgingtransport.org).

Beyond her research and leadership roles, Dr. Kockelman is dedicated to education, teaching courses in travel demand forecasting, transport economics, transportation system design, and data analysis, at the undergraduate and graduate levels. She will be at MIT in the Fall of 2025 for a working sabbatical.

Stephanie Pollack

During her career in the public, private, academic and non-profit sectors, Stephanie Pollack has applied a people-focused, data-driven and pragmatic approach to tackling transportation and other public policy challenges. She has spent the last decade in senior leadership positions in State and Federal transportation agencies. Most recently, Pollack served at the US Department of Transportation as a senior advisor to Secretary Pete Buttigieg on implementation of the Bipartisan Infrastructure Law and improving project delivery. Prior to that, she served as

Deputy (and Acting) Administrator of the Federal Highway Administration, focusing on safety and helping to shape and then implement FHWA's $350 billion share of BIL programs and funding. As Secretary and CEO of the Massachusetts Department of Transportation for six years, she led a multi-modal state transportation agency (including serving on the board of the Massachusetts Port Authority and overseeing the work of a specially-created Fiscal Management and Control Board for the MBTA transit agency). Before her government service, Pollack held increasingly senior advocacy, policy and leadership positions at the Conservation Law Foundation, provided strategic consulting on transportation and sustainable development and conducted research at and helped to design and teach in a newly-created School of Public Policy and Urban Affairs at Northeastern University. At Northeastern University, Pollack taught core courses on public policy as well as classes on transportation, housing and land use policy. Through her career, she has engaged in advocacy, policymaking, consulting and research a range of related policy issues beyond transportation and infrastructure including economic development, sustainability, public health, housing and land use.

Jamey Tesler

Jamey Tesler is currently the executive director of the Mass Mobility Hub, a public benefit corporation with a mission to support mobility and transportation companies in their growth and accelerate change in this sector. Previously, Jamey served as Secretary and Chief Executive Officer of the Massachusetts Department of Transportation, where he was responsible for a fully multimodal state transportation department, oversaw the leadership of the Massachusetts Bay Transportation Authority and served on the board of the Massachusetts Port Authority. Jamey had also served as Registrar of the Massachusetts Registry of Motor Vehicles (RMV) in June of 2020, after serving in the role on an interim basis since June of 2019. Jamey has previously worked for more than 20 years in senior management roles in the public sector with experience in infrastructure, transit, sustainability, mobility, public finance, and public policy. Jamey has been a Visiting Fellow at the Taubman Center for State and Local Government at the Harvard Kennedy School of Government in 2023 and 2024.

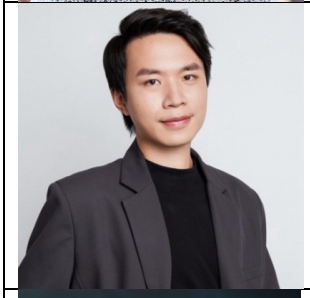
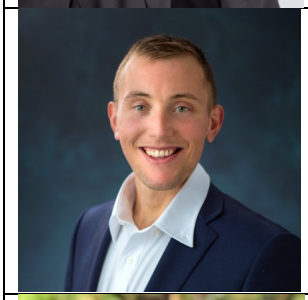
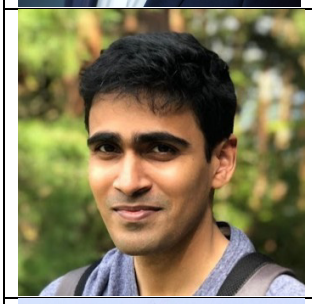
David Zipper

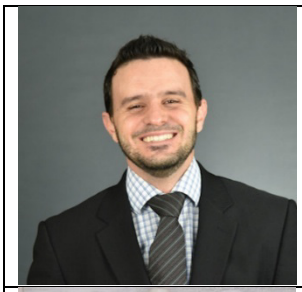
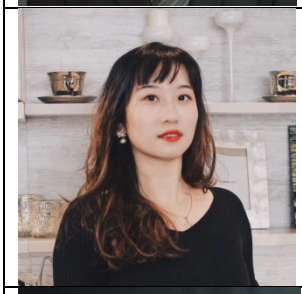
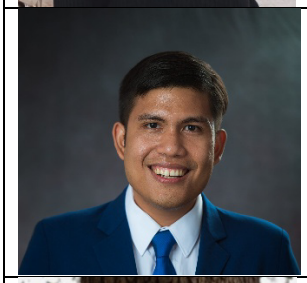
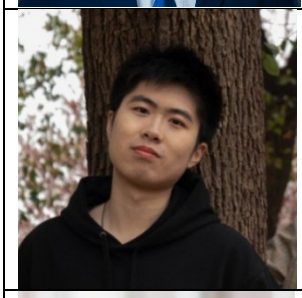
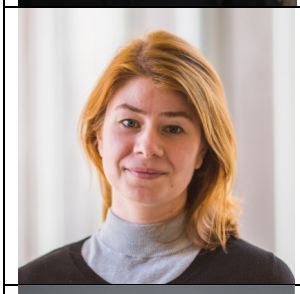
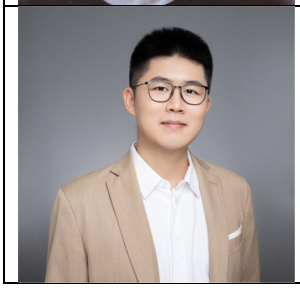
David Zipper examines the interplay between transportation policy, technology, and society. A Contributing Writer at Vox & Bloomberg CityLab, David's writing has been published in outlets including The Washington Post, The Atlantic, Slate, and Vox. His articles focus on topics including road safety, climate change, the uses of transportation data, and the future of American public transit.

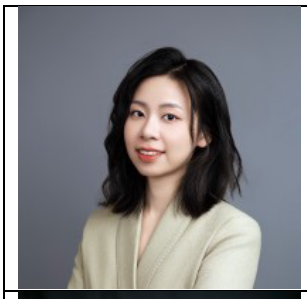
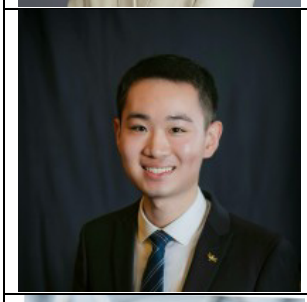
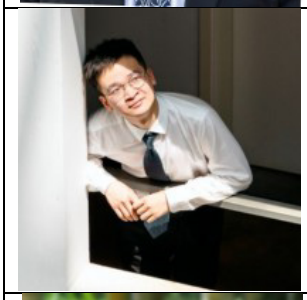
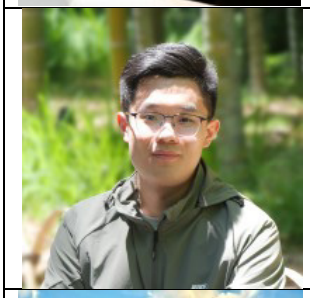
David was previously the Managing Director for Smart Cities and Mobility at 1776, a global entrepreneurial hub with over 1,300 member startups. Earlier in his career he served as the Director of Business Development and Strategy under two mayors in Washington DC, where he led support for the region's first startup incubators and guided the city's response to the emergence of ride hail. Before moving to Washington, David served as Executive Director of NYC Business Solutions in New York City under Mayor Bloomberg.

David holds an MBA with Highest Honors from Harvard Business School, an M. Phil in Land Economy (Urban Planning) from Cambridge University, and a BA with High Honors from Swarthmore College. He has been selected as a Truman Scholar, a Gates Scholar, and a Baker Scholar. David was a MMI Senior Fellow for 2024 too.

Transportation Students Spotlight

	Riccardo Fiorista is a 3rd year PhD student in the Transportation program at MIT, working on multi-modal AI for mobility data and urban mobility co-design.
	Dingyi Zhuang is a 5th year PhD student in the Transportation program at MIT, working on advancing trustworthy and generative AI to model, design, and plan urban transportation systems.
	Alex Carroll is a 1st year PhD student in the Transportation program at MIT, working on Agentic AI plus Operations Research for Procurement and Pricing.
	Tanay Deshpande is a 1st year PhD student in the Transportation program at MIT, working on Vehicle Routing Problems - Heuristic algorithms, time dependencies and human fatigue.
	Angie Moon is a 3rd year PhD student in the Transportation program at MIT, working on Bayesian entrepreneurship to compute, program, and reason innovation, with a focus on the transportation industry.

	Fabio Castro is a 6th year PhD student in the Transportation program at MIT, working on studying data-driven decision-making for operations and supply-chain management of micro-retailers.
	Ziyan Li is a 2nd year PhD student in the Transportation program at MIT, working on studying Stochastic Dual Dynamic Programming for Heavy-duty Electric Truck Operations.
	Austin Saragih is a 5th year PhD student in the Transportation program at MIT, working on responsible operations, analytics, and design (ROAD) for a circular and resilient economy.
	Yuhan Tang is a 2nd year master's student in the Transportation program at MIT, working on Optimization, Machine Learning, and Agent-based Approaches in Urban Mobility Decision Making.
	Magdalena Misiewicz is a 2nd year master's student in the Transportation program at MIT, working on Rail Operations Staffing with a focus on Annual Leave and Time Off.
	ChenAn Shen is a 3rd year master's student in the Transportation program at MIT, working on Discrete Choice Modeling, Travel Behavior and Policy, Pedestrian Street Experience.

	Hanyong Xu is a 3rd year PhD student in the Transportation program at MIT, working on studying Algorithmic fairness, travel behavior, and their intersection with platform economy.
	Donghang Li is a 2nd year master's student in the Transportation program at MIT, working on Causal Inference, Machine Learning, Transportation Economics and Policy.
	Michael Leong is a 4th year PhD student in the Transportation program at MIT, working on studying Urban Tavel Patterns, Strategic City Design, Transit-Oriented Development.
	Mingyi He is a 1st year master's student in the Transportation program at MIT, working on Generative Urban AI, ML for human mobility and urban planning.
	Zhaoxiang Li is a 1st year PhD student in the Transportation program at MIT, working on studying Emerging Mobility Technologies, Sustainable Transportation, Labor Market Impacts, and Transportation Equity.
	Niaz Mahmud Zafri is a 2nd year PhD student in the Transportation program at MIT, working on studying Sustainable travel behavior, integrated land use and transportation planning, computational approaches, and transportation in low-income countries.

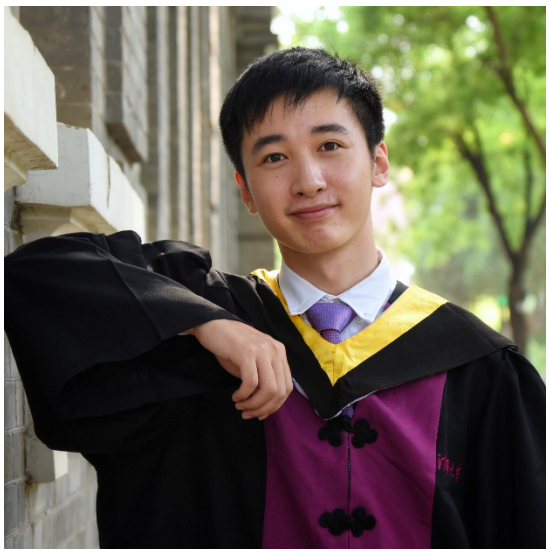
MMI Visiting Students

MMI' formal program for hosting Visiting PhD students from across the world for a term at MIT entered its second year in 2024. All visiting students are provided with an MIT ID, and work with the MMI directors, MIT Transit Lab faculty & students and others across MIT on projects that contribute to MMI's mission of creating a safe, clean and inclusive transportation system.

For 2024-25 we hosted Marvin Greifenstein from the University of St. Gallen and Yi Ju from University of California, Berkeley.

Marvin Greifenstein is a PhD student at the University of St. Gallen in Switzerland, specializing in Transportation Science and Behavioral Mobility Research. His research lies at the intersection of behavioral science, mobility systems, and urban policy. He focuses on understanding and shaping travel behavior while designing multimodal mobility systems that integrate public transport with emerging modes such as autonomous vehicles and shared mobility services. His work covers the adoption of autonomous mobility, including shared autonomous vehicles like robotaxis, roboshuttles, robouses and urban air mobility solutions.

During his time at MMI, Marvin contributed to research projects examining the deployment and public perception of robotaxis in San Francisco. He also collaborated to explore the impact of AI into mobility systems and their current applications.



Yi is a PhD student majoring in Systems Engineering at UC Berkeley, advised by Prof. Scott Moura, and a member of Energy, Controls & Applications Lab (eCal). His research interests broadly lie in sustainable and intelligent energy systems, with applications in buildings, microgrids, transportation and other societal systems. His recent work focuses on electric vehicle (EV) charging infrastructure, from both technical (controls) and social (incentives, equity) perspectives.

Prior to coming to Berkeley, he received his bachelor's degree from Tsinghua University.

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Fujitsu Chair Professor in the EECS Department

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Batteries, Fuel Cells

Moshe Ben-Akiva

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George Barbastathis

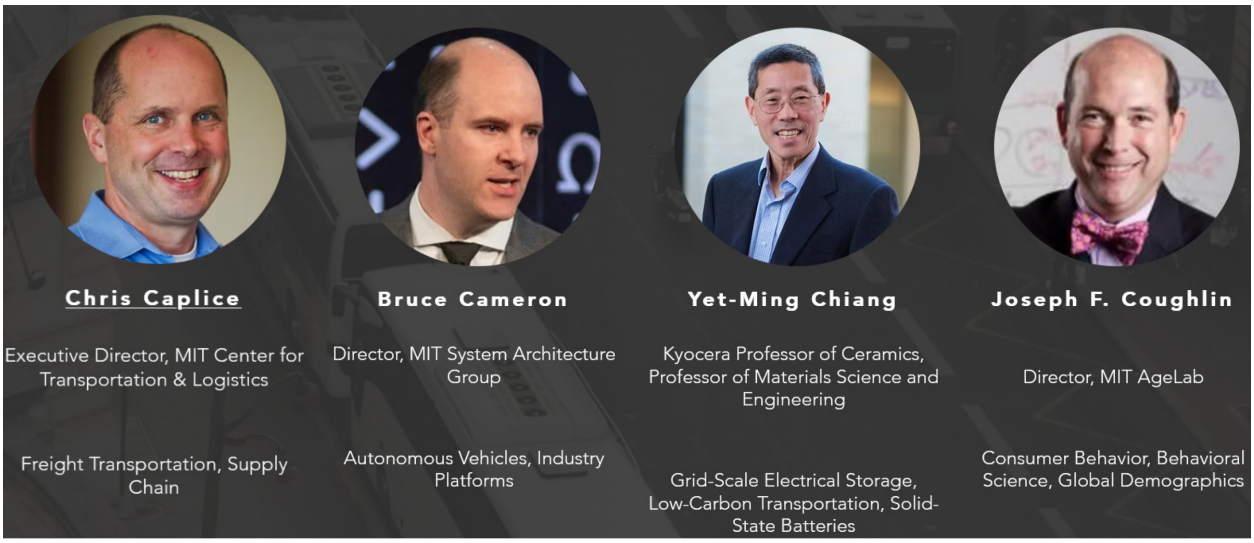
Professor of Mechanical Engineering

Information Optics, Digital Holography, Subwavelength Optical Engineering

Cynthia Barnhart

Abraham J. Siegel Professor of Management Science and Professor of Operations Research

Large-scale optimization, Airlines operations, Transportation operations, planning, and control



Chris Caplice

Executive Director, MIT Center for Transportation & Logistics

Freight Transportation, Supply Chain

Bruce Cameron

Director, MIT System Architecture Group

Autonomous Vehicles, Industry Platforms

Yet-Ming Chiang

Kyocera Professor of Ceramics, Professor of Materials Science and Engineering

Grid-Scale Electrical Storage, Low-Carbon Transportation, Solid-State Batteries

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Director, MIT AgeLab

Consumer Behavior, Behavioral Science, Global Demographics

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Robotics, Autonomous Vehicles, Perception and Vision

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Aerospace Systems, Engineering Systems, Technology Development, Multidisciplinary Design Optimization

Fábio Duarte

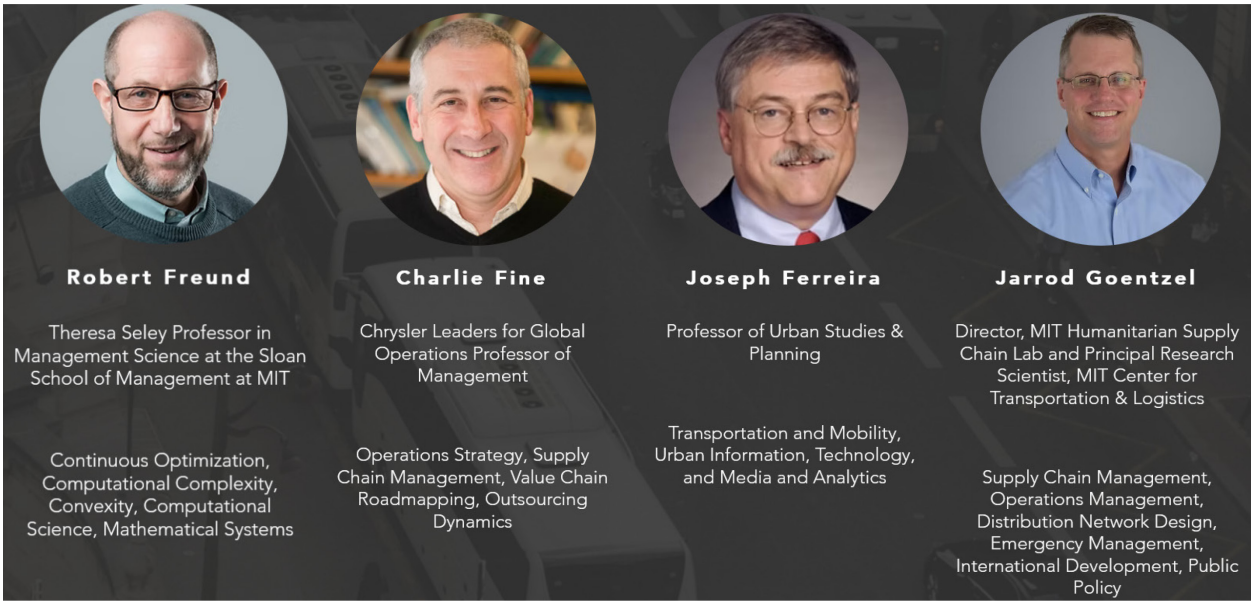
Principal Research Scientist and Lecturer of Transportation Policy and Planning

Urban Technologies, Transportation and Planning, Social Construction of Technologies

Daniel Freund

Assistant Professor of Operations Management

Analytics, Combinatorial Optimization, Management Science, Operations Management, Sharing Economy



Robert Freund

Theresa Seley Professor in Management Science at the Sloan School of Management at MIT

Continuous Optimization, Computational Complexity, Convexity, Computational Science, Mathematical Systems

Charlie Fine

Chrysler Leaders for Global Operations Professor of Management

Operations Strategy, Supply Chain Management, Value Chain Roadmapping, Outsourcing Dynamics

Joseph Ferreira

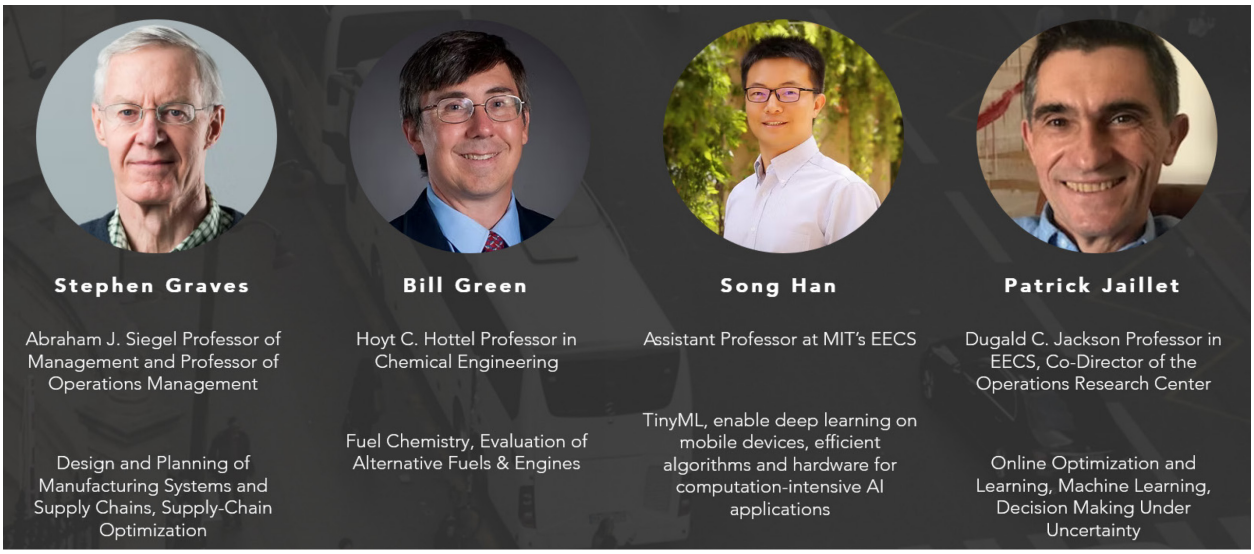
Professor of Urban Studies & Planning

Transportation and Mobility, Urban Information, Technology, and Media and Analytics

Jarrod Goentzel

Director, MIT Humanitarian Supply Chain Lab and Principal Research Scientist, MIT Center for Transportation & Logistics

Supply Chain Management, Operations Management, Distribution Network Design, Emergency Management, International Development, Public Policy



Stephen Graves

Abraham J. Siegel Professor of Management and Professor of Operations Management

Design and Planning of Manufacturing Systems and Supply Chains, Supply-Chain Optimization

Bill Green

Hoyt C. Hottel Professor in Chemical Engineering

Fuel Chemistry, Evaluation of Alternative Fuels & Engines

Song Han

Assistant Professor at MIT's EECS

TinyML, enable deep learning on mobile devices, efficient algorithms and hardware for computation-intensive AI applications

Patrick Jaillet

Dugald C. Jackson Professor in EECS, Co-Director of the Operations Research Center

Online Optimization and Learning, Machine Learning, Decision Making Under Uncertainty

Ali Jadbabaie

JR East Professor of Engineering

Network Science, Decision Theory, Cooperative Control Of Multi-Agent Systems, Optimal Control, Motion Coordination

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Stochastic optimization, data-driven decision-making, analytics, vehicle routing, transportation scheduling

Jason Jackson

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Community Development, Economic Development, Law and Policy, Machine Learning, Transportation and Mobility

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Economics, Finance and Accounting

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Professor of Aeronautics and Astronautics

Robotics, Autonomous Vehicles, Foundations of Mobility

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Principal Research Scientist

Advanced Simulation and Augmented Reality for Urban Design, Mobility-on-Demand Systems

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Silicon Photonics for LiDAR Sensing, AR Displays, Optical Communications, Quantum Engineering, and Biophotonics

Asu Ozdaglar

Distinguished Professor and Department Head, EECS; Deputy Dean of Academics, Schwarzman College of Computing

Nonlinear and Convex Optimization: Theory and Algorithms; Game Theory; Social and Economic Networks

Amedeo Odoni

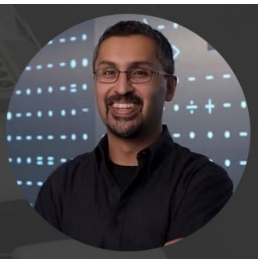
T. Wilson Chair Professor Emeritus of Aeronautics and Astronautics

Operations Research, Stochastic Systems, Air Transportation, Urban Services

Georgia Perakis

William F. Pounds Professor of Management, EMBA Faculty Director, Operations Research Center Co-Director

Operations Management, Management Science, Pricing, Revenue Management, Supply Chains, Machine Learning, Optimization



Nick Roy

Professor of Aeronautics and Astronautics

Robotics, Machine Learning, Autonomous Systems, Planning and Reasoning, Human-Computer Interaction, Micro Air Vehicles

Daniela Rus

Andrew (1956) and Erna Viterbi Professor of Electrical Engineering and Computer Science

Robotics, Artificial Intelligence, and Data Science

Carlo Ratti

Professor of Urban Technologies and Planning, SENSEable City Lab Director

Education, Transportation and Mobility, Urban Information, Technology, and Media and Analytics

Daniel Roos

Japan Steel Industry Professor, Emeritus, Civil and Environmental Engineering

Technology and policy, Transportation systems, Industry studies, Information systems

Elisabeth Reynolds

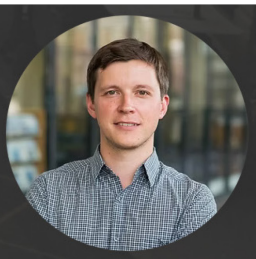
Lecturer, MIT Department of Urban Studies and Planning

National and Regional Systems of Innovation, Competitiveness, Manufacturing Ecosystems

David Simchi-Levi

Professor of Civil and Environmental Engineering

Supply Chain Management, Operations Management, Operations Research, Business Analytics, Artificial Intelligence



Andres Sevtsuk

Charles and Ann Spaulding Career Development Associate Professor of Urban Science and Planning

Spatial Analysis, Walkability, Public Transport, Business Location Patterns, Urban Design

Tobias Salz

Castle Krob Career Development Assistant Professor of Economics

Industrial Organization, Applied Econometrics, Applied Microeconomics

Don Sadoway

John F. Elliott Professor of Materials Chemistry

Electrochemistry, Electrochemical extraction & sensors, recycling of metals, lithium solid-polymer-electrolyte batteries

Yossi Sheffi

Director of the MIT Center for Transportation & Logistics

Systems Optimization, Risk Analysis, Supply Chain Management

Paolo Santi

Principal Research Scientist at MIT Senseable City Lab

Modeling and analysis of complex systems

Anson Stewart

Research Scientist

Spatial Analysis, Urban Transportation, Public Transportation

Sanjay Sarma

Vice President for Open Learning (2013-2022) and Professor of Mechanical Engineering

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Jessika Trancik

Professor of Data, Systems, and Society

Infrastructure and decarbonization, Low-carbon transport, Vehicle electrification, Storage Technologies, Environmental Analysis, Energy Technologies

Nigel Wilson

Professor Emeritus

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Cathy Wu

Gilbert W. Winslow (1937) Career Development Assistant Professor

Machine Learning, Control Theory, Multi-agent Systems, Implications of AI & Automation

Sarah Williams

Associate Professor of Technology and Urban Planning

Semi-formal Transportation, Urban Information, Technology, Media Design, Data Action, Urban Design, Data Visualization and Privacy

Matthias Winkenbach

Director of the MIT Megacity Logistics Lab; Director of the MIT CAVE Lab

Multi-tier Distribution Network Design, Urban Logistics, Last-Mile Delivery, Urban Freight Policy, Data Analytics and Visualization

Authors

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John Moavenzadeh, Executive Director, MIT Mobility Initiative
Jinhua Zhao, Founder and Faculty Director, MIT Mobility Initiative