

MIT Industrial Liaison Program Faculty Knowledgebase Report

2023 MIT Madrid Symposium

April 20, 2023 4:00 pm - 7:30 pm

4:00 PM

Welcome and introduction
Raimundo Pérez-Hernández y Torra
Director, [Ramón Areces Foundation](#)



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Until he joined the Ramón Areces Foundation, his professional career was in Public Administration, where he held the positions of adviser at the Spanish Permanent Delegation to the United Nations; economic and trade adviser at the Spanish Embassy in France; Head of Protocol in the Spanish Prime Minister's Office, with the rank of director-general; executive chairman of the Organising Committee for the Spanish Presidency of the European Union Council, with the rank of under-secretary; Ambassador and permanent representative to the United Nations and other international organisations based in Geneva; chairman of the Executive Committee of the United Nations High Commission for Refugees. He has served as Spanish Ambassador to the Republic of Austria and Chief of Protocol at the Ministry of Foreign Affairs (MAEC), with the rank of ambassador.

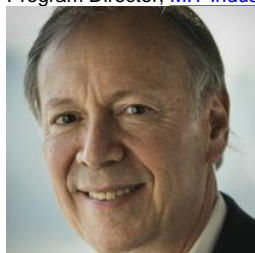
Klaus Schleicher
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Bumps Along the Road to Widespread Adoption of Electric Vehicle

Donald Sadoway

John F. Elliott Professor Emeritus of Materials Chemistry, [MIT Department of Materials Science and Engineering](#)

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[MIT Department of Materials Science and Engineering](#)

Donald R. Sadoway is the John F. Elliott Professor Emeritus of Materials Chemistry in the MIT Department of Materials Science and Engineering. He obtained the B.A.Sc. in Engineering Science, the M.A.Sc. in Chemical Metallurgy, and the Ph.D. in Chemical Metallurgy, all from the University of Toronto. After a year of postdoctoral study at MIT as a NATO Fellow, Dr. Sadoway joined the faculty in 1978. He is the author of over 180 scientific papers and holder of over 37 U.S. patents, and his research is directed towards the development of batteries for grid-level storage and mobile applications as well as environmentally sound technologies for the extraction of metals. Sadoway's contributions include two breakthroughs. First came the liquid metal battery, which could enable the large-scale stationary storage of renewable energy. That represents a huge step forward in the transition to green energy, according to António Campinos, president of the European Patent Office, when Sadoway won the [2022 European Inventor Award](#) for the invention in the category for non-European Patent Office Countries. The second breakthrough is molten oxide electrolysis, which produces metal from ore with no CO₂ emissions. Discovered at MIT, Sadoway spun out the company today known as Boston Metal, which is the most credible solution to green steel. In 2012 he was named by Time magazine as one of the 100 Most Influential People in the World.

Professor Donald Sadoway's research seeks to establish the scientific underpinnings for technologies that make efficient use of energy and natural resources in an environmentally sound manner. The overarching theme of his work is electrochemistry in nonaqueous media. Specific topics in applied research are environmentally sound electrochemical extraction and recycling of metals; rechargeable batteries for stationary storage or mobile applications; synthesis of thin films or of nanoparticles in cryogenic media.

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Over his long career as an electrochemist and professor, Donald Sadoway has earned an impressive variety of honors, from being named one of *Time magazine's* [100 most influential people](#) in 2012 to [appearing on "The Colbert Report,"](#) where he talked about "renewable energy and world peace,". In August of 2022, Sadoway and colleagues published a paper in *Nature* about one of the first new battery chemistries in 30 years, that invented something that was better, much better, than the expensive lithium-ion batteries used in today's electric cars. In this talk, Prof. Sadoway discusses challenges of new battery chemistries that have to satisfy the demanding performance requirements of cost, sustainability, and supply chain security for environmental friendly mobility of the future.

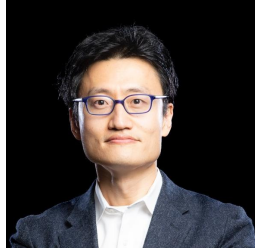
5:00 PM

Behavior and Computation: Urban Mobility in the Future of Work

Jinhua Zhao

Professor of Cities and Transportation

Founder, [MIT Mobility Initiative](#)



Jinhua Zhao

Professor of Cities and Transportation

Founder

[MIT Mobility Initiative](#)

Jinhua Zhao is the Professor of Cities and Transportation at the Massachusetts Institute of Technology (MIT). Prof. Zhao integrates behavioral and computational thinking to decarbonize the world's mobility system.

Prof. Zhao founded the [MIT Mobility Initiative](#), coalescing the Institute's efforts on transportation research, education, entrepreneurship, and engagement. He hosts the [MIT Mobility Forum](#), highlighting transportation innovation from MIT and across the globe.

Prof. Zhao directs the [JTL Urban Mobility Lab](#) and [Transit Lab](#), leading long-term collaborations with transportation authorities and operators worldwide and enabling cross-culture learning between cities in North America, Asia, and Europe.

Prof. Zhao leads the program "[Mens, Manus, and Machina \(M3S\)](#): How AI Impacts the Future of Work and Future of Learning" at the Singapore MIT Alliance for Research and Technology (SMART).

He is the co-founder and chief scientist for [TRAM.Global](#), a mobility decarbonization venture.

Research Interest

He brings behavioral science and transportation technology together to shape travel behavior, design mobility systems, and reform urban policies. He develops computational methods to [sense](#), [predict](#), [nudge](#), and [regulate](#) travel behavior and designs multimodal mobility systems that integrate [automated](#) and [shared](#) mobility with [public transport](#). He sees transportation as a [language](#) to describe a person, characterize a city, and understand an institution and establishes the behavioral foundation for transportation systems and policies.

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The transportation world is booming but in flux: the industry is being reshuffled, communities and cities are often confused and anxious about their mobility future, and the ecosystem pressure is daunting. Mobility is in the midst of profound transformation with an unprecedented combination of new technologies: autonomy, electrification, connectivity, and AI, meeting new evolving priorities: decarbonization, public health, and social justice. Prof. Zhao focuses on two forces that drive the mobility future: behavior and computation. Behaviorally he investigates is travel social? is travel emotional? and is travel perceptual? He uses a behavioral lens to examine mobility technologies and translates business decisions into a set of behavioral inquiries. Computationally, he brings AI and machine learning methods to sense, predict, nudge and regulate travel behavior.

In this talk, Prof. Zhao illustrates the power of fusing behavioral and computational thinking to design multimodal mobility systems in the context of the future of work. Job is an anchor. It secures one's economics, defines one's social identity, and grounds one in the defined time, space and organizational (T, S, O) arrangements. The future of work is shaking this anchor and loosening each dimension of such arrangements. There are a spectrum of 'workplaces', different degrees of temporal flexibilities, and a variety of employer-employee relationships. Combining the three dimensions yields a rich set of more fluid (T, S, O) arrangements. We bring organization behavior and travel behavior together and propose an agenda for both empirical and methodological research. Transportation industry can be more ambitious--mobility service providers, workplace providers and corporations working together to imagine the future of work and mobility.

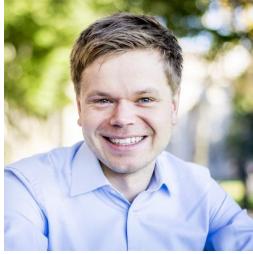
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Coffee Break

Creating a Sustainable Future for Aviation

Florian Allroggen

Laboratory Executive Officer & Research Scientist, [MIT Department of Aeronautics and Astronautics](#)



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Laboratory Executive Officer & Research Scientist

[MIT Department of Aeronautics and Astronautics](#)

Dr. Allroggen is a Research Scientist in MIT's Department of Aeronautics and Astronautics and the Department's Executive Director Aerospace Climate & Sustainability. He is co-leading the MIT Laboratory for Aviation and the Environment and the Transportation Decarbonization efforts in the MIT Climate and Sustainability Consortium. Furthermore, he is the Executive Director of MIT's Zero Impact Aviation Alliance.

His research brings together Transport Economics, Environmental Economics, and related research questions in Energy Economics. In his recent work, he focuses on understanding the transition of transportation towards sustainable solutions. He develops and applies methods for techno-economic and lifecycle assessments, policy analyses, cost-benefit analysis, and market response modeling.

Dr. Allroggen is a nominated expert to the International Civil Aviation Organization's Committee on Aviation Environmental Protection, particularly the Fuels Task Group and the Long-Term Aspirational Goal Task Group.

Air transportation provides vital links for business and leisure passengers and enables transportation of perishable goods, goods of high value, and time-critical deliveries. At the same time, global civil air transportation is estimated to contribute about 2% to anthropogenic CO₂ emissions. Non-CO₂ effects result in aviation's impact on anthropogenic warming to be at around 5%. In addition, aviation emissions contribute to global-scale air pollution leading to impaired human health.

In this talk, Dr. Allroggen outlines aviation's broader economic and environmental impacts and will discuss strategies for mitigating the environmental footprint. As the air transportation sector is adopting increasingly ambitious environmental goals, while trying to expand global access to the air transportation network, system-wide solutions will be needed. These include large-scale adoption of low-carbon fuels, new aircraft and engine technologies, and new ways for operating aircraft.

Roundtable
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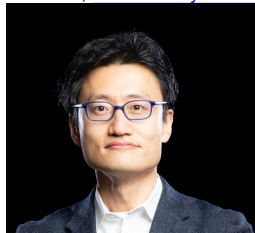
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Wrap Up and Closing Remarks
Raimundo Pérez-Hernández y Torra
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Before joining MIT, Eduardo was the Director of Santander Universities at Santander Bank, N.A., based in Boston, MA. In this role, he managed the institutional and business relationship with 46 universities, mainly in the northeastern US. He also served as Santander US representative at President Obama's 100,000 Strong in the Americas initiative and the Woman for Africa Foundation, among other relevant global higher education projects, and as Member of the Global President's Council at NYU and the Advisory Boards of the Deming Cup, ECLA (Columbia University) and Newcastle University Business School.

Before coming to the US, Eduardo had several roles at Banco Santander Río (Argentina). As Director of Santander Universities, he started the first entrepreneurship initiative at Grupo Santander worldwide, including the launching of a business plan competition, the Technology Innovation Venture Capital Fund, and a national competitiveness development initiative. He also sponsored the first edition of MIT 50K in Argentina. As Director of Organization and Quality at Banco Santander Río, he led the team that obtained the first Global ISO 9001:2000 certificate for a financial institution in Latin America, certifying all main processes and areas of the bank. He also steered the business process reengineering project for the whole Bank, partnering with Ernst & Young and McKinsey and Co and implemented the Retail Banking new operating model.

Before joining Banco Santander Río, Eduardo was Senior Manager of the Financial Services and Capital Markets Group at Price Waterhouse Management Consultants in Madrid, Spain. He was the Practice Leader of Business Process Reengineering, Financial Risk Management and Risk Adjusted Profitability Measurement.

Before his assignment at Price Waterhouse he served as Director of Consulting Services at MSA International, Inc. and as Financial Control Manager at Citibank España, S.A.

Eduardo graduated as Industrial Engineer at Universidad de Buenos Aires and has a MBA

