MIT CENTER FOR TRANSPORTATION & LOGISTICS

Research Portfolio & Scholarly Impact

A Combined Review of Research Publications and Sponsored Research Activity

Part 1 — Research Output & Scholarly Impact, 2010–2026 *pp. 3—11*

A bibliometric analysis of publications, citations and research themes

Part 2 — Publications of the Past Twelve Months, July 2025 – June 2026 *pp. 12—26*

A reference catalogue of the Center's most recent peer-reviewed output

Part 3 — Sponsored Research Activity, FY2012–FY2026 *pp. 27—30*

A descriptive overview of research funding trends, subject mix and sponsor base

Prepared for internal and external distribution

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About This Report

This report brings together three complementary analyses of the MIT Center for Transportation & Logistics into a single document. They answer different questions from different data, and are best read together.

Part 1 examines the Center's scholarly output — what was published, where, by whom, on what subjects, and to what measurable influence. Its source is the OpenAlex bibliographic database, and its unit of analysis is the publication.

Part 2 draws on the same OpenAlex source as Part 1. It is a reference catalogue of the Center's peer-reviewed publications from the most recent twelve months (July 2025 – June 2026), listing each work with its authors, venue, and — where available — a short summary. It is a detailed companion to the aggregate output analysis in Part 1, at the level of the individual publication.

Part 3 provides a high-level overview of the Center's sponsored research activity — how the volume of funded work has evolved over fifteen fiscal years, how its subject mix has shifted, and how its funding base has changed. Its source is a data extract of the Center's cost-collectors, and its unit of analysis is the award.

Parts 1 and 3 are deliberately independent: no figure in one is derived from the other, and neither is used to validate the other. Where they touch the same themes — the shift toward logistics and AI, the Center's engagement with industry — the two records corroborate one another from different directions, and those points of contact are noted in the text.

A note on the use of AI. This report and the analyses underlying it were prepared with the assistance of artificial intelligence. AI tooling was used to process the source data, compute the reported statistics, generate the figures, and draft the accompanying text. All inputs derive from institutional records — the Center's cost-collector extract and the OpenAlex bibliographic database — and the analyses, figures, and text were reviewed and validated by the author. Nonetheless, residual errors of data processing, classification, or interpretation cannot be fully excluded, and readers should verify individual figures against primary records before relying on them for formal purposes.

PART 1

Research Output & Scholarly Impact

A Data-Driven Overview, 2010–2026

Source: OpenAlex bibliographic database · 838 distinct publications · Roster of 50 researchers · Compiled July 2026

Executive Summary

Over the period 2010–2026, researchers affiliated with the MIT Center for Transportation & Logistics (CTL) authored **838 distinct peer-reviewed publications** that have together attracted **19,717 citations**. Measured on a field-normalized basis, the Center's work is cited at **3.62× the world average** for comparable publications — a level of influence that places CTL research well within the upper tier of its fields.

This document maps that output in detail: how it has grown, where it is published, what it is about, how heavily it is cited, and how it is distributed across the Center's researchers. Three findings stand out. **First, output and influence are still accelerating** — the most recent five years account for the highest annual publication and citation volumes on record. **Second, impact is exceptional and broad-based**: 273 papers (32.6%) rank in the top 10% most-cited for their field and year, and 38 rank in the top 1%. **Third, the Center's reach extends well beyond academia**: 29.6% of papers involve international co-authors and a substantial share reflect direct industry collaboration.

Headline metrics at a glance

Table 1. Headline metrics of research output, 2010–2026

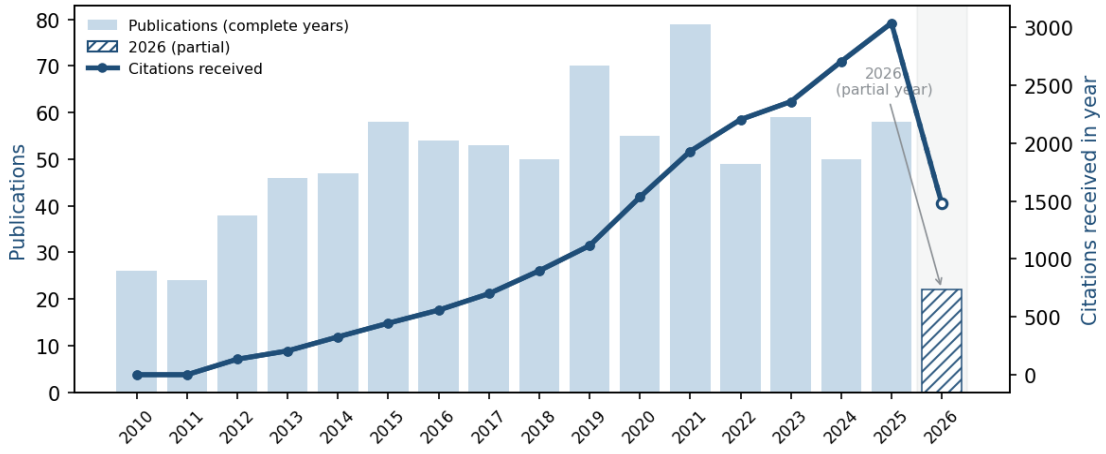
Indicator	Value
Distinct peer-reviewed publications (2010–2026)	838
Total citations to that body of work	19,717
Mean Field-Weighted Citation Impact (FWCI)	3.62
Publications in the top 1% of their field / year	38 (4.5%)
Publications in the top 10% of their field / year	273 (32.6%)
Open-access share	45.8%
Publications with international co-authorship	29.6%
Contributing researchers on roster	50

All figures count each publication once at the Center level, even when several CTL researchers co-authored it. See the note on methodology at the end of this document.

1. Two Decades of Growing Output and Influence

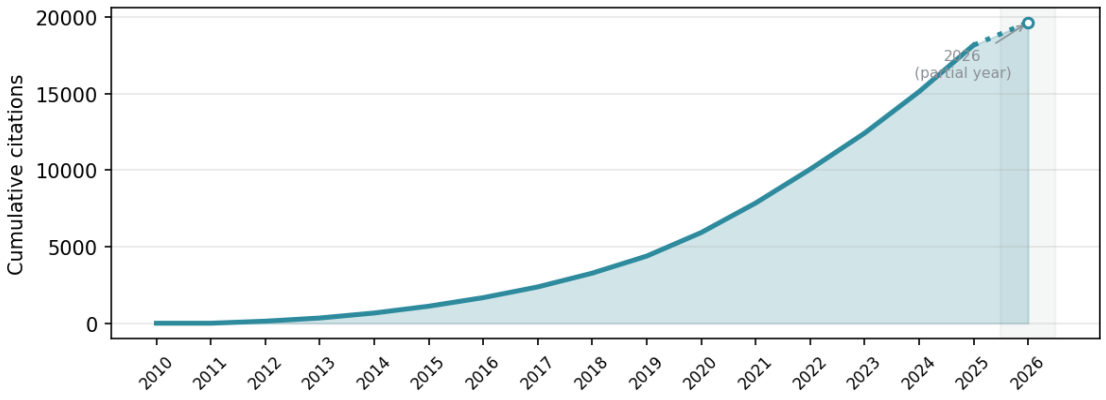
CTL's publication output has grown steadily across the period, roughly doubling from the low-to-mid 20s per year at the start of the decade to a sustained 50–80 publications per year since 2019. Citations to that work have risen far more steeply — a natural consequence of a maturing body of scholarship whose earlier papers continue to accumulate references while new, highly-cited work is added on top. In **2025 alone, CTL research attracted more than 3,000 citations** (Figure 1).

Figure 1. Annual publications (bars) and citations received per year (line), 2010–2026. The final year (2026) is shown hatched and with a dotted line to indicate an incomplete year.



Viewed cumulatively, the compounding nature of the Center's influence is clearer still (Figure 2). The total stock of citations to CTL research has grown without interruption, reaching **19,717 by mid-2026**. The curve's steepening slope indicates that the Center's recent work is being cited faster than its historical work ever was.

Figure 2. Cumulative citations to CTL research, 2010–2026. The final segment (into 2026) is dotted to indicate an incomplete year.



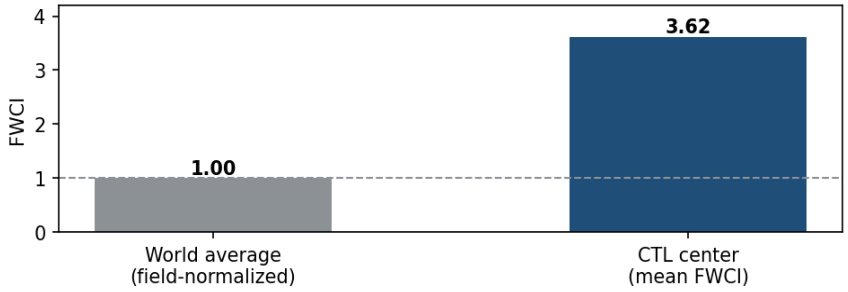
2. The Quality of Impact, Not Just the Volume

Raw publication and citation counts scale with the size of a group and the age of its work. To assess *quality of impact* independently of size and field, this section uses field-weighted measures, which compare each paper against the global body of work published in the same field, year, and document type.

Cited far above world average

The Center's mean Field-Weighted Citation Impact is **3.62**. An FWCI of 1.0 represents the world average; CTL's work is therefore cited at more than **three and a half times the expected rate** for comparable publications (Figure 3). This is a demanding benchmark that does not reward volume — a large group of averagely-cited papers would score near 1.0.

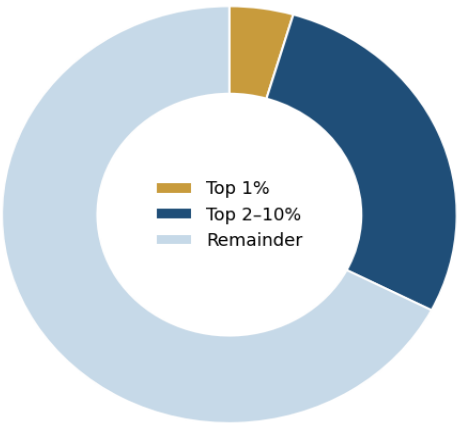
Figure 3. Mean Field-Weighted Citation Impact of CTL research versus the field-normalized world average (1.0).



A deep bench of top-percentile work

The Center's standing does not rest on a handful of outliers. Of its 838 publications, **273 (32.6%) sit in the top 10%** of their field and year by citations, and 38 (4.5%) reach the top 1% (Figure 4). In other words, a group whose output matched the world average would place only 10% of its work in the top decile; CTL places roughly three times that share.

Figure 4. Distribution of CTL publications by citation percentile within their field and year.



The Center as a single scholarly entity

The measures above can also be applied to the Center's body of work taken as a whole, treating CTL as if it were a single author. On this basis the Center's collected output has an **aggregate h-index of 75** — meaning 75

of its papers have each been cited at least 75 times — and an i10-index of 343, meaning 343 papers have each accumulated ten or more citations. These figures are computed over the deduplicated pool of 838 Center publications, so shared papers are counted once; they describe the durable, well-cited core of the Center's scholarship rather than its peak individual performances. Taken together with the 3.62 mean FWCI and the 32.6% top-decile share, they indicate a Center whose influence is both deep (a large well-cited core) and high-quality (cited far above field norms).

Representative high-impact publications

The following papers illustrate the range and reach of the Center's most-cited work across its two principal research streams.

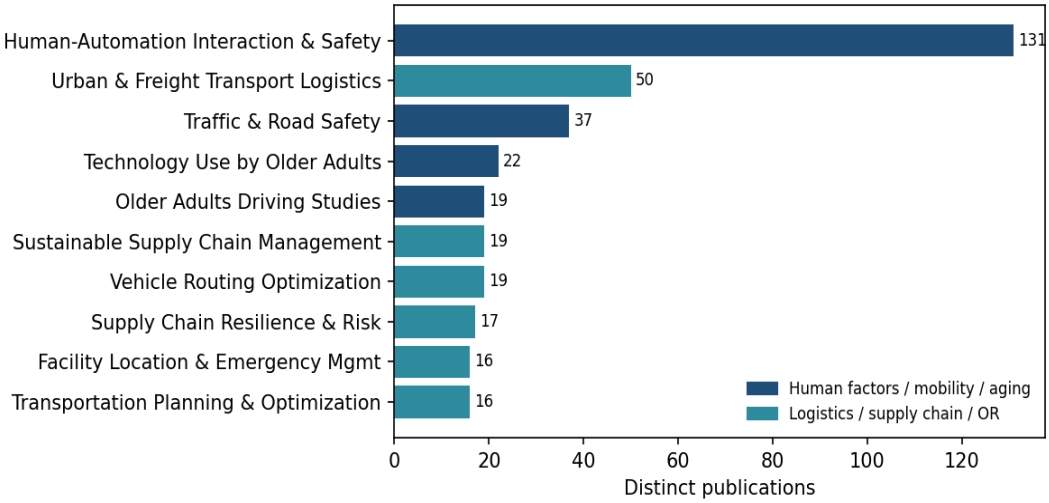
Table 2. Representative high-impact publications, 2010–2026

Publication (abbreviated title)	Year	Citations
Older Adults' Adoption of Technology: An Integrated Approach	2014	775
Do as AI Say: Susceptibility in Deployment of Clinical Decision-Aids	2021	451
Applications and Research Avenues for Drone-Based Models in Logistics	2021	368
Generative Artificial Intelligence in Supply Chain and Operations	2024	361
Supply Chain Resilience for Single and Multiple Sourcing	2017	358
Sensitivity of Physiological Measures for Detecting Systematic Variations	2012	282
A Truck-and-Drones Model for Last-Mile Delivery	2019	220

3. What the Center Researches

Classified against OpenAlex's research-topic taxonomy, CTL's corpus reveals a distinctive **dual identity**. One stream concerns human factors, mobility, safety, and aging — the study of how people interact with vehicles, automation, and transportation systems across the lifespan. The other concerns logistics, supply-chain management, and operations research — the optimization, resilience, and sustainability of the systems that move goods. Figure 5 shows the ten largest themes, colored by stream.

Figure 5. Top ten research themes by number of distinct publications, 2010–2026.



This breadth is a strength for a Center positioning itself within a larger department: CTL contributes depth in operations research and supply-chain science while also housing one of the most productive human-factors and transportation-safety programs in the field. The corpus spans **engineering, psychology, business and management, and the social sciences** as its largest disciplinary fields, reflecting genuinely interdisciplinary reach rather than a single-method group.

Where the work is published

Consistent with the Center's dual identity, its publications appear in two largely distinct sets of leading venues. The human-factors, mobility, and aging stream publishes in transportation-safety, ergonomics, and gerontology journals; the logistics, supply-chain, and operations-research stream publishes in production, operations, and transport-economics journals. The most frequent outlets for each are shown below.

Table 3. Leading outlets — human factors, mobility & aging, 2010–2026

Journal / venue	Papers (2010–26)
Proceedings of the Human Factors and Ergonomics Society	37
Innovation in Aging	31
Accident Analysis & Prevention	15
Transportation Research Part F (Traffic Psychology & Behaviour)	13
Ergonomics	9
Journal of Safety Research	7
Transportation Research Record	7
Traffic Injury Prevention	6

Table 4. Leading outlets — logistics, supply chain & operations research, 2010–2026

Journal / venue	Papers (2010–26)
International Journal of Production Research	13
Transportation Research Part E (Logistics & Transport Review)	9
Production and Operations Management	8
European Journal of Operational Research	8
International Journal of Production Economics	6
Computers & Industrial Engineering	5
International Journal of Physical Distribution & Logistics Management	5
Transportation Research Part D (Transport & Environment)	5
Transportation Science	4

Counts reflect distinct Center journal papers per venue over 2010–2026, assigned to a stream by research field and topic. Some venues publish across both streams; each paper is attributed to a single stream. Conference-proceedings series are excluded.

4. Recent Research Directions, 2021–2026

To characterize where the Center's attention has turned most recently, this section examines the **246 publications from 2021 to 2026**, drawing on their abstracts and topic classifications. The two research identities remain clearly visible, but each has developed distinctive recent emphases — and a shared thread of artificial intelligence and machine learning now runs through both.

Human factors, mobility & aging (2021–2026)

The stream's 114 recent papers concentrate on **driver behavior and vehicle automation** — the interaction between human drivers and increasingly automated systems is the single most frequent subject, with sustained work on the transitions between manual and automated control, driver monitoring, and personalized driving models. A second cluster addresses **traffic and road safety**, including crash analysis and traffic prediction. A third, distinctively CTL, cluster concerns **older adults' mobility, technology adoption, and financial well-being in later life**, extending the Center's aging research from the road into retirement, disability, and technology use. A notable recent line studies **human trust in and reliance on AI decision-aids** — the stream's single most-cited recent paper (451 citations) examines susceptibility to AI recommendations in clinical decision-making.

Table 5. Leading recent topics — human factors, mobility & aging, 2021–2026

Leading recent topics (2021–26)	Papers
Human-Automation Interaction & Safety	29
Traffic & Road Safety	12
Technology Use by Older Adults	7
Traffic Prediction & Management	7
Autonomous Vehicle Technology & Safety	6
Retirement, Pension & Financial Literacy	6

Logistics, supply chain & operations research (2021–2026)

The stream's 132 recent papers are led by **urban and freight transport logistics** and **vehicle-routing optimization**, the Center's long-standing last-mile and network-design strengths — including recent work on drone-based delivery, order batching for on-demand food delivery, and smart-parking systems. A prominent and growing emphasis is **supply-chain resilience and risk management**, reflecting the disruptions of the early 2020s, alongside continued work on **humanitarian logistics and facility location**. The most striking recent development is the rapid rise of **artificial intelligence and machine learning as logistics methods**: the stream's two most-cited recent papers address drone-based logistics models (368 citations) and generative AI in supply chain and operations (361 citations), and abstract analysis shows “learning,” “framework,” and “prediction” among the fastest-rising terms.

Table 6. Leading recent topics — logistics, supply chain & operations research, 2021–2026

Leading recent topics (2021–26)	Papers
Urban & Freight Transport Logistics	20
Vehicle Routing Optimization Methods	11
Supply Chain Resilience & Risk Management	7
Facility Location & Emergency Management	6
Advanced Manufacturing & Logistics Optimization	5
Consumer & Retail Behavior	5

The methods behind the research

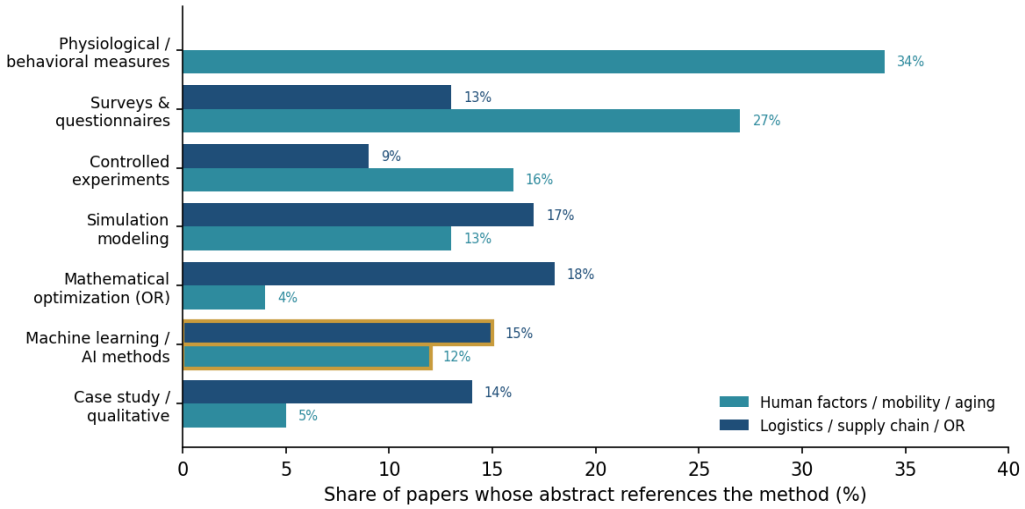
The two identities are distinguished not only by what they study but by *how they study it*. An analysis of the methods referenced in paper abstracts across the full 2010–2026 corpus reveals two clearly different — and complementary — methodological cultures (Figure 6).

The **human-factors, mobility, and aging** stream is predominantly **empirical and human-subjects-based**. Its most frequent methods are physiological and behavioral measurement — eye-tracking, gaze and glance analysis, heart-rate and driving-performance data, often collected in instrumented vehicles or driving simulators — referenced in roughly a third of abstracts, followed by surveys and questionnaires and controlled experiments and trials. This reflects a research program built on observing how real people behave, perceive, and physiologically respond in transportation and technology settings.

The **logistics, supply-chain, and operations-research** stream is predominantly **model- and computation-based**. Its most frequent methods are mathematical optimization and operations-research techniques — mixed-integer and linear programming, heuristics and metaheuristics, combinatorial and network optimization — closely followed by simulation modeling. Case studies and industry-data analyses ground this work in practice. This is the signature of a program built on formulating, solving, and validating models of complex logistics systems.

Across both streams, the fastest-growing methodology is **machine learning and artificial intelligence**. Over the full period, AI/ML methods appear in roughly 12% of human-factors abstracts and 15% of logistics abstracts — but that understates a sharp recent acceleration. In the **2021–2026 window, AI/ML is referenced in 21% of human-factors papers and 26% of logistics papers**, roughly doubling its earlier prevalence. In the human-factors stream this appears as work on driver-state modeling, trust in automation, and AI decision-aids; in the logistics stream, as learning-based routing and demand prediction and, most recently, generative AI for supply-chain and operations problems. This shared and rising methodological commitment is the clearest technical bridge between the Center's two identities.

Figure 6. Share of papers in each research stream whose abstract references a given class of method, 2010–2026. A paper may use more than one method. Physiological and behavioral measurement is essentially unique to the human-factors stream; mathematical optimization and simulation dominate the logistics stream; machine-learning methods (highlighted) are now prominent in both.



Read together, the recent record shows a Center that is **deepening its established strengths while converging on a common methodological frontier**. Both identities are increasingly engaged with AI and data-driven methods —

applied to driving and human-automation interaction on one side, and to supply-chain optimization and resilience on the other — which positions the Center well for cross-cutting collaboration within a larger department.

Topic counts are OpenAlex primary-topic classifications for 2021–2026; thematic and methodological descriptions draw on abstract text, available for roughly 80% of papers. Method categories are identified by terminology in abstracts and are indicative rather than exhaustive.

5. Reach Beyond the Academy

A Center's value lies partly in its external connectivity. CTL's publication record shows substantial reach on two dimensions. International collaboration is embedded in the Center's work: 29.6% of publications (248 papers) involve co-authors based in more than one country, reflecting CTL's global network of affiliated programs and partners.

The record also reflects CTL's strong engagement with industry. At least 12.8% of publications (107 papers) include a co-author affiliated with a company. This figure should be read as a conservative floor: several of the Center's corporate partners are recorded in bibliographic databases under non-corporate affiliations, so the true rate of industry-linked scholarship is higher. Even so, it substantially exceeds what a purely academic group would show, and it corroborates CTL's distinctive partnership-driven model.

Table 7. Reach beyond the academy — international, industry and open-access shares

Dimension of reach	Publications	Share
International co-authorship	248	29.6%
Industry co-authorship (conservative floor)	107	12.8%
Open access (freely available)	384	45.8%

6. The Research Team

The Center's output is produced by a roster of 50 researchers spanning faculty, principal and senior research scientists, postdoctoral researchers, and doctoral students. Notably, 320 of the 838 publications are co-authored by more than one roster member, evidence of a genuinely collaborative internal culture rather than a collection of independent operators. (Because of this internal co-authorship, summing individual totals would overstate the Center's output; every Center-level figure in this document counts each paper once.)

The table below profiles the Center's most influential researchers, ranked by h-index — a measure that rewards sustained citation impact across a body of work rather than volume alone. It is intended to show the depth of the senior bench, not to rank colleagues; early-career members not listed here contribute substantially to the collaborative output described above.

The bench combines senior researchers with large, highly-cited bodies of work — several with career h-indices above 25 and, in the human-factors group, above 40 — with a cohort of mid-career scientists whose field-weighted impact is exceptional relative to their output. Members working in supply-chain analytics, operations research, and last-mile logistics record mean FWCIs well above the Center average, while the human-factors and aging group contributes both the largest publication volumes and a series of field-defining, heavily-cited studies. This blend of established authority and high-efficiency emerging talent is a durable asset.

Table 8. The research team — most influential researchers by h-index

Researcher	Role	h-index	i10	Pubs	Citations	Mean FWCI
Bryan Reimer	Research Scientist	47	142	215	5,582	3.32
Joseph Coughlin	Senior Research Scientist	47	108	182	4,427	2.79
Bruce Mehler	Research Scientist	40	99	177	4,772	3.36
Matthias Winkenbach	Senior Research Scientist	27	37	45	2,575	5.38
Yossi Sheffi	Faculty	25	38	11	237	4.60
Lisa D'Ambrosio	Research Scientist	23	38	90	1,177	1.71
Maria Jesus Saenz	Research Scientist	20	24	35	1,397	9.34
Pnina Gershon	Research Scientist	20	30	67	1,063	2.81
Jarrod Goentzel	Principal Research Scientist	17	21	30	926	4.57
Chaiwoo Lee	Research Scientist	16	26	61	1,498	3.25
Milena Janjevic	Research Scientist	16	18	19	827	3.29
Christopher Caplice	Senior Research Scientist	15	19	17	242	2.13
Christopher Mejia-Argueta	Research Scientist	14	17	42	720	2.99
Eva Ponce	Research Scientist	13	13	28	748	8.70
Elenna Dugundji	Research Scientist	13	17	60	533	2.29

h-index and i10-index are OpenAlex career figures (all years, all output); publications, citations, and mean FWCI reflect 2010–2026 Center output. Researchers are ordered by h-index, then by citations.

7. Overall Assessment

Strengths

Impact is well above world average, and broad-based. The corpus of 838 publications carries a mean FWCI of 3.62 — cited at more than three and a half times the world average for its fields — and 273 papers (32.6%) sit in the top 10% of their field and year, roughly three times the 10% a world-average group would place there. **The well-cited core is deep, not a few outliers.** Treated as a single scholarly entity, the Center's output carries an aggregate h-index of 75 and an i10-index of 343, computed over the deduplicated pool so shared papers count once. **Output and citations are still rising.** Annual publications roughly doubled from the low-to-mid 20s early in the period to a sustained 50–80 per year since 2019, and citations reached more than 3,000 in 2025 alone. **Two established research identities, with a common methodological frontier.** The corpus divides into a human-factors, mobility and aging stream and a logistics, supply-chain and operations-research stream, publishing in largely distinct venues. AI/ML methods appear in 21% of recent human-factors abstracts and 26% of recent logistics abstracts, roughly double their earlier prevalence — the clearest technical bridge between the two. **Collaboration is genuinely internal and international.** 320 of the 838 publications are co-authored by more than one roster member, and 29.6% involve co-authors based in more than one country.

Challenges and Opportunities

Industry co-authorship is a floor, not a measurement. The 12.8% figure understates reality because some corporate partners are recorded in bibliographic databases under non-corporate affiliations. The true rate of industry-linked scholarship cannot be established from this data. **Open access is below half.** 45.8% of publications are freely available, which bears on the reach of the work outside subscribing institutions. Promoting open access may be an opportunity to further CTL’s academic reach, especially of its junior researchers.

PART 2

Publications of the Past Twelve Months

A Catalog of CTL Scholarly Output, July 2025 – June 2026

Source: OpenAlex bibliographic database · 65 peer-reviewed publications · Compiled July 2026

Executive Summary

Over the twelve months from July 2025 through June 2026, MIT CTL researchers published 65 peer-reviewed works — 51 journal articles and 14 conference papers — across 36 distinct venues, with 30 members of the Center's roster appearing as authors. This catalogue records each publication in full, grouped by month, as a publication-level companion to the aggregate output analysis in Part 1.

The recent record reflects the Center's two research identities. The human-factors, mobility and aging stream contributes sustained work on driver behavior and partial vehicle automation, road safety, and technology, caregiving and financial well-being in later life; the logistics, supply-chain and operations-research stream contributes last-mile and vehicle-routing work, supply-chain resilience and mapping, and a growing body of AI and machine-learning methods — several of the most recent papers apply large language models and generative AI to supply-chain problems. Abstracts are available for 44 of the 65 publications; the remainder are listed with their research topics and keywords.

8. Detailed Publication Catalog, July 2025 – June 2026

Each entry below records the publication's title, its authors — Center members shown in bold — the venue and date of publication, and, where an abstract is available, a short summary of the work. Entries are grouped by month, most recent first.

Publication dates, abstracts, and research topics are drawn from OpenAlex. Abstracts are available for 44 of the 65 publications; where none is on record — common for very recent articles and for journals that do not deposit abstracts to the index — the entry instead lists its research topics and keywords. Because bibliographic indexing lags publication, the most recent weeks may not yet reflect every work.

JUNE 2026

1. Environmental context is associated with differences in driver behavior around partial automation alerts
Alexandra S. Mueller; **Pnina Gershon**; Samantha H. Haus; Jessica B. Cicchino; **Bruce Mehler**; **Bryan Reimer**
Journal article · Journal of Safety Research · June 17, 2026 · doi:10.1016/j.jsr.2026.05.013
Subject. *Human-Automation Interaction and Safety; Traffic and Road Safety* · Keywords: *Context, Automation, Task, Advanced driver assistance systems (no abstract on record).*

2. Driver behavior around driver readiness alerts versus attention reminders while using Tesla Autopilot
Alexandra S. Mueller; **Pnina Gershon**; Samantha H. Haus; Jessica B. Cicchino; **Bruce Mehler**; **Bryan Reimer**
Journal article · Journal of Safety Research · June 17, 2026 · doi:10.1016/j.jsr.2026.05.021
Subject. *Human-Automation Interaction and Safety; Traffic and Road Safety* · Keywords: *Autopilot, Driving simulator, Phase, Human factors and ergonomics (no abstract on record).*

3. Enhancing driving safety & user experience: An interpretable visual demand simulation model for in-vehicle information system
Jiateng Li; Jiateng Li; **Bruce Mehler**
Journal article · Expert Systems with Applications · June 13, 2026 · doi:10.1016/j.eswa.2026.133187
Subject. *Human-Automation Interaction and Safety; Data Visualization and Analytics* · Keywords: *Interpretability, Distraction, Touchscreen, Visualization, Driving simulator (no abstract on record).*

4. Leveraging Geospatial Analysis and Machine Learning for Optimal Green Vehicle Assignment
Josué C. Velázquez-Martínez; Laura Palacios-Argüello; Ade Barkah; Jan C. Fransoo; Karla M. Gámez-Pérez
Journal article · INFORMS Journal on Applied Analytics · June 8, 2026 · doi:10.1287/inte.2021.0061
Abstract. This paper presents a data-driven approach that uses geospatial analysis and machine learning to assign the right vehicles to the right regions, reducing fuel consumption, costs, and transportation-related CO 2 emissions. Applied to a large retail fleet, the methodology achieved an 8% improvement in fuel efficiency and emissions, while also identifying how older vehicles can be strategically deployed to enhance their performance.

5. From distraction to support: evolving perspectives on driver attention support and the case for a holistic, context-aware framework
Bryan Reimer; Linda Angell; Alexandria M. Noble; **Bruce Mehler**; Lee Skrypchuk; Steven Feit; Gregory M. Fitch
Journal article · Transportation Research Part F Traffic Psychology and Behaviour · June 5, 2026 · doi:10.1016/j.trf.2026.103658
Abstract. Since the original development of driver distraction guidelines, scientific understanding of driver workload, attention threading, situation awareness, and the influence of driving context has significantly evolved—driven largely by insights from naturalistic driving studies and other research. Concurrently, vehicle technologies have advanced, integrating new forms of internal and external sensing, increased computational power, larger and often multiple screens, multi-modal interfaces, and feedback systems. This paper reviews and builds upon prior research and guidelines, particularly those coming out of the U.S., as that is the background of the majority of the authors, to propose a new conceptual framework for attention support. The framework, developed through a pre-competitive collaboration between academic and industry partners promotes an updated, attention-centric approach to…

6. Designing multi-compartment last-mile vehicle fleets: An open-source matheuristic

Eric Kohan; Fabricio Torres; Victor Silva-Febre; **J.C. Pina-Pardo**

Journal article · Computers & Industrial Engineering · June 3, 2026 · doi:10.1016/j.cie.2026.112134

Subject. *Vehicle Routing Optimization Methods; Transportation and Mobility Innovations* · Keywords: *Vehicle routing problem, Production, Key (no abstract on record).*

7. The Role of Packaging in Smart Home Design

Nour Al Maalouf; **Chaiwoo Lee**

Conference paper · Proceedings of DRS · June 2, 2026 · doi:10.21606/drs.2026.2076

Abstract. As technology becomes vital to aging independently, its first points of contact such as packaging influence accessibility and confidence. This study examines how older adults engage with technology through packaging. Nineteen Boston-based adults aged 65 to 85 interacted with three smart home kit packaging prototypes. Observations and interviews highlighted four main insights: Participants preferred (1) design that supported independent use, (2) visible organization of all components, (3) easy, tool-free opening, and (4) sustainable, recyclable materials. Ninety-five percent recalled past frustration with packaging that felt like it was meant “for someone else.” These results suggest that designing for longevity means rethinking the tactile and emotional entry points to technology. Packaging can serve as a bridge for inclusion and trust. Future research will focus on the other key…

8. A Mixed Methods Investigation Examining COVID-19 Vaccine Decision-Making Among Older Vaccinators and Non-Vaccinators in the Southeastern U.S.

Taylor Patskanick Brennan; Sophia Ashebir; **Alexa Balmuth**; Lisa D’Ambrosio; **Joseph F. Coughlin**

Journal article · Journal of General Internal Medicine · June 1, 2026 · doi:10.1007/s11606-026-10526-z

Subject. *Vaccine Coverage and Hesitancy; SARS-CoV-2 and COVID-19 Research* · Keywords: *Vaccination, Thematic analysis, Context, Focus group, Health care (no abstract on record).*

MAY 2026

9. Decision support for partial automation: Driver behavior and trust with different versions of automated lane change

Samuel S. Monfort; David Kidd; Jessica B. Cicchino; Alexandra S. Mueller; Ian Reagan; **Pnina Gershon**; Zach Noonan; **Bruce Mehler**; **Bryan Reimer**

Journal article · Journal of Safety Research · May 20, 2026 · doi:10.1016/j.jsr.2026.05.015

Abstract. INTRODUCTION: Automated lane change systems allow drivers to receive support for maneuver execution and sometimes initiation. Research suggests that delegating action selection to automation can impair awareness and reduce readiness to intervene if automation fails. The current study was designed to compare manual lane changes with two automated variants: driver-initiated but system-executed, and system-initiated and -executed after driver confirmation. METHOD: Fourteen drivers were provided with instrumented Tesla Model 3s for a 4-week study period, during which video of the driver, the cabin, and the forward roadway, as well as data on vehicle speed and position were recorded. Automated lane changes were compared with manual lane changes, with each automated event matched to a similar manual one through stratified random sampling. Self-report questionnaires were administered at the…

10. From Models to Mobility Systems: A Survey of Multimodal Dynamic Traffic Assignment

Elisabeth Fokker; Robert D. van der Mei; **Elenna R. Dugundji**

Journal article · Operations Research Forum · May 8, 2026 · doi:10.1007/s43069-026-00642-1

Abstract. Abstract Multimodal dynamic traffic assignment models are widely used to estimate traffic flow patterns and support decision-making in transportation supply, infrastructure planning, and traffic management. As transportation systems shift toward multimodal, service-oriented, and data-driven approaches, existing models face growing challenges in realism and scalability. This survey reviews recent advances in multimodal dynamic traffic assignment, with a focus on modeling heterogeneous traffic, incorporating multiple transportation modes, and capturing interactions between different vehicle types. The evolution of dynamic traffic assignment from single- to multimodal frameworks is reviewed, alongside recent modeling and data-driven approaches, including deep reinforcement learning for adaptive, agent-based routing. Key research gaps are identified, and a future research agenda is…

11. LLM-Based Reconstruction of Mining Supply Chain Networks: Evidence on Concentration, Geography, and Fragility

Жандос Кегенбеков; Alima Alipova; **Ilya Jackson**

Journal article · Applied Sciences · May 5, 2026 · doi:10.3390/app16094536

Abstract. Mining supply chains are strategically important yet difficult to observe because firm-to-firm relationships are fragmented across unstructured public disclosures. This paper applies a retrieval-augmented large language model (LLM) framework to reconstruct mining supply chain networks from unstructured textual data. While the underlying methodology builds on prior work on supply chain mapping using generative AI, the focus here is on its deployment in the mining sector, where structured data on firm-to-firm relationships is particularly limited. The resulting dataset contains 1231 focal mining firms, 4602 directly connected firms, and 8279 directed supplier–customer relationships. The reconstructed network exhibits a pronounced core–periphery structure, with a small number of highly connected firms sustaining a disproportionate share of overall connectivity. We also document strong…

APRIL 2026

12. Digital twin transition for intelligent and resilient industrial systems

Serena Finco; Ji Bao; **Ilya Jackson**; Yuqian Lu

Journal article · International Journal of Production Research · April 10, 2026 · doi:10.1080/00207543.2026.2655025

Abstract. Digital twins (DTs) are a vital technology transforming industrial systems by linking the physical and digital realms through real-time, bidirectional data flow and intelligent analysis. This special issue of the International Journal of Production Research presents 14 original contributions that advance both the theoretical framework and practical applications of digital twins in diverse industrial settings, such as production control, process monitoring, human-machine collaboration, supply chains, maintenance, and value-based deployment. The articles are grouped into three key themes: (i) DT architectures, modelling principles, and trustworthy development; (ii) smart production management, process optimisation, and digital integration; and (iii) human-centered applications, supply chain support, and industrial value creation. Collectively, they offer a comprehensive overview of…

13. From Prediction to Design: Using Context-Aware Graph Neural Networks and Explainable AI to Anticipate Transfer-of-Control

Zhouqiao Zhao; **Pnina Gershon**

Conference paper · SAE technical papers on CD-ROM/SAE technical paper series · April 7, 2026 · doi:10.4271/2026-01-0049

Abstract. Drivers often interact with partial automation (SAE Level 2) systems, initiating transfer of control (TOC) either by handing control over to the automation or by taking it back. Accurately predicting these interactions may inform the design of future automation systems that adapt proactively to the operating context, enhance comfort, and ultimately may improve safety. We present a context-aware framework that generates a unified driver–vehicle–environment representation by fusing data from in-cabin video of the driver and of the forward roadway with vehicle kinematics, driver glance, and hands-on-wheel behaviors. This representation was encoded in a hierarchical Graph Neural Network that classified driver-initiated TOCs to: (i) Manual-to-automation and (ii) Automation-to-manual transitions and predicted time-to-TOC. Shapley-based explainable AI was used to quantify how the importance of…

14. Hands-off the wheel: How individual differences shape driver inattention and disengagement in partial driving automation

Joonbum Lee; **Pnina Gershon**; Josh Domeyer; **Bruce Mehler**; **Bryan Reimer**

Journal article · Transportation Research Part F Traffic Psychology and Behaviour · April 1, 2026 · doi:10.1016/j.trf.2026.103618

Subject. *Human-Automation Interaction and Safety; Traffic and Road Safety* · Keywords: *Disengagement theory, Automation, Human factors and ergonomics, Injury prevention, Occupational safety and health (no abstract on record).*

MARCH 2026

15. Last-mile delivery with drone resupply at transshipment platforms

Juan C. Pina-Pardo; **Matthias Winkenbach**

Journal article · *Transportation Research Part E Logistics and Transportation Review* · *March 29, 2026* · doi:10.1016/j.tre.2026.104817

Subject. *UAV Applications and Optimization; Vehicle Routing Optimization Methods* · Keywords: *Transshipment, Drone, Truck, Exploit, TRIPS architecture* *(no abstract on record).*

16. Designing urban distribution networks with loading and unloading zones

Laura Palacios-Argüello; **Juan C. Pina-Pardo**; Clavijo Lopez

Journal article · *Computers & Industrial Engineering* · *March 14, 2026* · doi:10.1016/j.cie.2026.111974

Subject. *Railway Systems and Energy Efficiency; Optimal Power Flow Distribution* · Keywords: *Distribution, Production* *(no abstract on record).*

FEBRUARY 2026

17. Key enablers of dynamic capabilities for digital transformation in supply chain management

Christoph Lennartz; **María Jesús Sáenz**; Carl Marcus Wallenburg; Michela Guida

Journal article · *Operations Management Research* · *February 3, 2026* · doi:10.1007/s12063-025-00575-8

Subject. *Digital Transformation in Industry; Supply Chain Resilience and Risk Management* · Keywords: *Dynamic capabilities, Supply chain, Control reconfiguration, Unpacking, Digital transformation* *(no abstract on record).*

18. A Randomized Trial Using PARO with Minimal Caregiver Involvement on Older Adults with Dementia in Group Homes

Kaoru Inoue; Mitsunobu Kono; Ryuji Kobayashi; Chiyomi Yatsu; Daryl Patrick Yao; Takanori Shibata; **Joseph F. Coughlin**; Masahiro Shigeta

Journal article · *Alzheimer s & Dementia* · *February 1, 2026* · doi:10.1002/alz.71163

Abstract. INTRODUCTION: PARO, a baby seal robot, has shown promise in addressing behavioral and psychological symptoms of dementia (BPSD) in clinical settings. However, little is known about PARO's benefits when used independently of health professionals. This study examined that scenario in older adults with dementia. METHODS: Applying a cluster-randomized design, we randomly assigned six facilities to once- or thrice-weekly self-directed PARO sessions for a month. BPSD severity and caregiver burden scores of the Neuropsychiatric Inventory Brief Questionnaire were measured. RESULTS: Findings from 85 participants indicated a significant reduction in caregiver burden in the thrice-weekly group (least-squares [LS] mean: -3.29, 95% confidence interval [CI]: [-6.26, -0.32], p = 0.030). For BPSD severity, while clinically meaningful improvement was observed, no significant difference was found…

JANUARY 2026

19. Network-RBV for Critical Minerals: How Standards, Permits, and Licensing Shape Midstream Bottlenecks

Zhandos Kegenbekov; Alima N. Alipova Alipova; **Ilya Jackson**

Journal article · *Sustainability* · *January 21, 2026* · doi:10.3390/su18021084

Abstract. Critical mineral supply chains underpin electric mobility, power electronics, clean hydrogen, and advanced manufacturing. Drawing on the resource-based view (RBV), the relational view, and dynamic capabilities, we conceptualize advantage not as ownership of ore bodies but as orchestration of multi-tier resource systems: upstream access, midstream processing know-how, standards and permits, and durable inter-organizational ties. In a world of high concentration at key stages (refining, separation, engineered materials), full “decoupling” is economically costly and technologically constraining. We argue for structured cooperation among the United States, European Union, China, and other producers and consumers, combined with selective domestic capability building for bona fide security needs. Methodologically, we conduct a structured conceptual synthesis integrating RBV, relational view,…

20. Supply chain mapping through retrieval-augmented generation: applications to the electronics industry
Ilya Jackson; **María Jesús Sáenz**; Dmitry Ivanov; Benedict Jun Ma
Journal article · Journal of the Operational Research Society · January 8, 2026 · doi:10.1080/01605682.2025.2608868
Abstract. This paper presents a novel methodology for automated multi-tier supply chain mapping, leveraging Retrieval-Augmented Generation (RAG) and network science techniques. We developed an RAG-based approach that extracts supplier-customer relationships from unstructured public data sources, including SEC 10-K filings and earnings calls. The extracted entities are structured into a directed supply chain graph and analysed using network science metrics such as centrality, modularity, and path length. The case study focuses on three of the largest contract manufacturers in the electronics industry: Hon Hai Precision Industry (Foxconn), Flex Ltd., and Jabil Inc. Our findings demonstrate that Generative AI (GAI), specifically LLMs enhanced with RAG, can construct scalable and comprehensive supply chain graphs. The proof of concept is successful, as evidenced by the construction of a directed…

21. Adapting the MIT AgeLab's Taxonomy and Levels of Automation for Caregiving-Enabled Homes
Shabnam FakhrHosseini; **Chaiwoo Lee**; Mathew Milton; **Joseph F. Coughlin**
Conference paper · Lecture notes in computer science · January 1, 2026 · doi:10.1007/978-3-032-13022-8_17
Subject. *Context-Aware Activity Recognition Systems; Technology Use by Older Adults* · Keywords: *Taxonomy, Automation, Vocabulary, Home automation, Terminology (no abstract on record).*

22. Designing Instructions for Older Adults' Installation of Multi-Device Smart Home Systems
Nour Al Maalouf; **Chaiwoo Lee**
Conference paper · Lecture notes in computer science · January 1, 2026 · doi:10.1007/978-3-032-30424-7_2
Subject. *Context-Aware Activity Recognition Systems; Technology Use by Older Adults* · Keywords: *Home automation, Key, Smart card, Information system (no abstract on record).*

23. LifeTomorrow: A Socio-technical System Supporting Aging-in-Place and Informal Caregiving
Céline Madeleine Aldenhoven; Matthew Charles Milton; **Chaiwoo Lee**; Lisa D'Ambrosio
Conference paper · Lecture notes in computer science · January 1, 2026 · doi:10.1007/978-3-032-30424-7_3
Subject. *Technology Use by Older Adults; Innovative Human-Technology Interaction* · Keywords: *Information system, Data collection, Key (no abstract on record).*

24. Empathy for Ageing in Place: Expert Perspectives on Ageing Simulation Suits and Design Decision-Making
Elisa Cardamone; Lisa D'Ambrosio; **Joseph F. Coughlin**
Conference paper · Lecture notes in computer science · January 1, 2026 · doi:10.1007/978-3-032-30421-6_16
Subject. *Aging and Gerontology Research; Technology Use by Older Adults* · Keywords: *Empathy, Ageing, Expert system, Cognition (no abstract on record).*

DECEMBER 2025

25. Modeling the Supply Chain Network Evolution of a Food Banking Network
Ane Jansen van Vuuren; Euodia Vermeulen; Sara Grobbelaar; **Christopher Mejía-Argueta**
Journal article · Journal of Hunger & Environmental Nutrition · December 16, 2025 · doi:10.1080/19320248.2025.2601167
Abstract. Research on food banks often overlooks the growth and structure of these networks. This study analyses how a food bank's supply chain network (SCN) will evolve, and examines the implications these changes will have on the overall design using real-world food banking data. It employs agent-based modeling and a minimum cost flow network model to explore different scenarios. The study suggests that allowing warehouses to connect with collection points outside their province could reduce transport costs by 33%. A universal warehouse strategy does not adequately address food insecurity among specific vulnerable groups, as their unique environments require a more tailored approach.

26. Educating for Longevity: The Role of Immersive Technologies in Service Learning
Sheng-Hung Lee; Mechanical Engineering; **Joseph F. Coughlin**; Sofie Hodara
Conference paper · venue not recorded · December 2, 2025 · doi:10.21606/iasdr.2025.100
Abstract. As education adapts to the realities of a longevity society, new approaches are needed to engage learners in preparing for their long-term futures, particularly around financial well-being. This preliminary study explores how immersive technologies can enhance educational experiences in longevity planning by combining augmented reality (AR)

with tangible artifacts, the Longevity Planning Blocks (LPBs). We designed and prototyped three longevity coaching experiences—using projection AR, tablet AR, and wearable AR—to investigate their effectiveness in communicating abstract longevity planning concepts. Nine Boston-based participants aged 35–45 engaged in a 30-minute coaching session using one of three AR modalities, followed by reflective feedback captured through the Think Aloud method. Drawing from constructivist learning theory, we assessed how each immersive experience supports key…

27. Older Adults' Perspectives on Artificial Intelligence as a Source of Advice

Lauren Cerino; **Adam Felts**; **Alexa Balmuth**; Taylor Brennan; **Chaiwoo Lee**; **Joseph F. Coughlin**

Journal article · Innovation in Aging · December 1, 2025 · doi:10.1093/geroni/igaf122.1371

Abstract. Abstract A large proportion of Americans use generative AI tools to seek information and advice. Prior research suggests that older people are less likely than their younger counterparts to use generative AI (NORC, 2023), but older adults' attitudes toward AI technologies remain relatively obscure. Drawing on data from a national online survey study of American adults between ages 18 to 96 (N = 1008), this study examines older adults' experiences with AI and openness to receiving advice from AI-enabled tools. The survey included questions about experiences with AI and using AI-enabled chatbots for general use and advice. Preliminary findings indicate that most older adults had some level of familiarity with AI-enabled technologies, with nearly three-quarters (73.7%) of respondents aged 60 and older at least "a little" familiar. However, fewer (28.3%) in this age group reported having…

28. Middle-Income Americans and Preparing for Longevity

Lisa D'Ambrosio; **Alexa Balmuth**; Lauren Cerino; **Adam Felts**; Niels Wu

Journal article · Innovation in Aging · December 1, 2025 · doi:10.1093/geroni/igaf122.1987

Abstract. Abstract With longer lives, people face greater complexity in financial planning and management. While a range of services and products exist to address the needs of wealthy Americans, there remain significant needs and opportunities to support middle-income Americans in planning for their financial futures. To explore this, an online survey was fielded to a nationwide US sample of adults ages 18+ with household incomes between $50,000 and $200,000. Survey items included people's financial wellbeing, financial information sources, financial knowledge, and demographic characteristics. Results indicated that people were generally positive about being on the path to meeting their future financial goals, but were less confident about being financially prepared for older age. Most thought that they could be doing a better job of planning for their financial futures. Data indicated that…

29. Factors Impacting Family Caregivers' Adoption of Digital and AI-Enabled Technologies for Care-Related Tasks

Niels Wu; **Adam Felts**; **Alexa Balmuth**; **Chaiwoo Lee**; Lisa D'Ambrosio; **Samantha Brady**; Sophia Ashebir; **Joseph F. Coughlin**

Journal article · Innovation in Aging · December 1, 2025 · doi:10.1093/geroni/igaf122.1369

Abstract. Abstract Family caregivers are critical to the delivery of care for older adults, but may experience physical, financial, and emotional strains from the caregiving role. Although existing research has established the capacity for digital technologies to ease these strains, adoption remains limited for some technologies that could support care-related tasks, especially for newer, AI-enabled technologies, indicating a need to explore where caregivers encounter barriers related to usability, cost, availability, or value. In this study, an online questionnaire was fielded to members of the MIT AgeLab's CareHive Panel, an open membership panel of informal caregivers who either currently provide or formerly provided care to an adult family member. Current caregivers (n = 192) were asked about their reasons for avoidance or cessation of use for four AI-enabled technologies: home monitoring and…

30. Job Seeking While Caregiving: Is There a Hiring Penalty for Family Caregivers?

Samantha Brady

Journal article · Innovation in Aging · December 1, 2025 · doi:10.1093/geroni/igaf122.592

Abstract. Abstract Whether by choice or necessity, the majority of unpaid family caregivers to adults in the U.S. are employed. Prior research highlights the importance of work for caregivers' financial stability, emotional well-being, and physical health. However, less is known about how caregiving responsibilities for an adult affect job seekers, particularly in hiring decisions. While hiring bias against parents is well-documented, the impact of adult caregiving on employment opportunities remains under-explored. Using data from an original hiring experiment of hiring managers across the US, we examine how family caregivers are perceived in the hiring process and whether they face penalties due to their caregiving

roles. Results show that unpaid family caregivers are 4.4 percentage points less likely to be hired than equally qualified applicants without caregiving responsibilities and 2.7…

31. An Intersectional Approach to Understanding the Psychological Health Effects of Combining Work and Caregiving

Samantha Brady; Taylor Patskanick; **Joseph F. Coughlin**

Journal article · *Innovation in Aging* · *December 1, 2025* · doi:10.1093/geroni/igaf122.427

Abstract. Abstract Role theory suggests occupying simultaneous family caregiving and employment roles in midlife may exert positive and negative effects on psychological health. However, there is a lack of causal evidence examining the degree to which combinations of these roles influence psychological health at the intersection of gender and racial identity. Longitudinal data from the Health and Retirement Study (2004–2018) are used to estimate a series of individual fixed effects models examining combinations of employment status and parental caregiving situation on Center for Epidemiological Studies—Depression Scale (CES-D) depression scores among Black and White men and women aged 50–65. Subsequent models were stratified by intensity of caregiving situation and work schedule. Individual fixed effects models demonstrate combining work, and parental caregiving is associated with greater…

32. Exploring AI in the Multigenerational Workplace: Opportunities, Challenges and Best Practices

Samantha Brady; Lauren Cerino

Journal article · *Innovation in Aging* · *December 1, 2025* · doi:10.1093/geroni/igaf122.1368

Abstract. Abstract Artificial Intelligence (AI) is rapidly changing the nature of work across nearly all industries. With the potential to enhance efficiency, decision-making, and innovation, many workplaces are adopting a range of AI tools and solutions. In light of the rapid expansion of AI in the workplace as well as the aging of the U.S. workforce, it is imperative to understand the ways in which AI can support older workers while also presenting new challenges for this growing segment of workers. To understand the opportunities and challenges AI presents for workers across generations, we conducted in-depth interviews with human resource managers and executives across a variety of industries in the U.S. Interviews highlighted potential benefits of AI for older workers including greater productivity, work quality improvements, and the ability to shift from administrative and logistical tasks…

33. When Should I Start Planning For Retirement?: Comparing Perceptions of Retirement Planning Timelines

Kathryn Warren; **Adam Felts**; Lisa D'Ambrosio; **Joseph F. Coughlin**

Journal article · *Innovation in Aging* · *December 1, 2025* · doi:10.1093/geroni/igaf122.1989

Abstract. Abstract The demographic shift toward longer life expectancy changes how people are planning for retirement, necessitating both financial and lifestyle preparation for an increasing period of time beyond one's career. The anticipated duration of life without employment income affects retirement savings goals and the length of working life, making early and strategic planning essential. To explore people's attitudes toward the time necessary to prepare for retirement, the MIT AgeLab conducted a national online survey (N = 1152, ages 18-89), stratified by age and gender. Respondents were asked when they believed a person should begin to plan for life in retirement and when they expected they would (or, if already retired, when they did) retire. Among respondents who had not yet retired (N = 884), younger respondents anticipated a shorter preparation period. The 18-29 age group, on…

34. Managing Longevity Risks: Consumer Attitudes Toward and Experiences With Financial Products

Chaiwoo Lee; Kathryn Warren; Lisa D'Ambrosio; Sophia Ashebir; **Joseph F. Coughlin**

Journal article · *Innovation in Aging* · *December 1, 2025* · doi:10.1093/geroni/igaf122.1988

Abstract. Abstract Financial products such as annuities, life insurance, and disability insurance are positioned to play a key role in future planning, including retirement, by providing financial security; hedging against different kinds of financial risks, including illness, injury, or death; and maintaining a steady income stream throughout older age. A national online survey of employed American adults ages 25 to 67, with medium to high income or investable assets, explored consumers' sense of preparedness for their financial futures and lives in older age. Items included people's overall financial well-being; attitudes toward and usage of various financial products; attitudes toward different longevity risks; and expectations for retirement. Data on demographic characteristics, recent and anticipated life events, and behavioral characteristics such as risk attitudes and optimism were also…

NOVEMBER 2025

35. Memory inception through gaze-contingent message exposure: using virtual reality to study media influence
Hee Jung Cho; Sue Lim; **María Jesús Sáenz**; Ralf Schmälzle
Journal article · Journal of Communication · November 20, 2025 · doi:10.1093/joc/jqaf048

Abstract. Abstract Media messages shape our knowledge about the world, but measuring individual exposure and attention remains challenging. Emerging media offer a solution to studying message reception in simulated real-world environments, which may soon become the actual media environments in which we encounter messages. Here, we utilized virtual reality (VR) and eye-tracking to investigate message processing in a realistic virtual city environment populated with billboards. We introduced an inception-style manipulation where billboards initially overlooked by participants were covertly reintroduced based on real-time gaze tracking. Our findings show this algorithmic manipulation, undetected by participants, significantly boosted message memory retention for the targeted messages. This study reveals a path of media influence, demonstrating how undetected algorithmic manipulations can shape…

OCTOBER 2025

36. Design Principles and Impact of a Learning Analytics Dashboard: Evidence from a Randomized MOOC Experiment
Inma Borrella; **Eva Ponce-Cueto**
Journal article · Applied Sciences · October 28, 2025 · doi:10.3390/app152111493

Abstract. Learning Analytics Dashboards (LADs) are increasingly deployed to support self-regulated learning on online courses. Yet many existing dashboards lack strong theoretical grounding, contextual alignment, or actionable feedback, and some designs have been shown to inadvertently discourage learners through excessive social comparison or high inference costs. In this study, we designed and evaluated a LAD grounded in the COPES model of self-regulated learning and tailored to a credit-bearing Massive Open Online Course (MOOC) using a data-driven approach. We conducted a randomized controlled trial with 8745 learners, comparing a control group, a dashboard without feedback, and a dashboard with ARCS-framed actionable feedback. The results showed that the dashboard with feedback significantly increased learners' likelihood of verification (i.e., paying for the certification track), with mixed…

37. State Policy Liberalism in Adolescence and Risk for Dementia from 2000 to 2016 among Older U.S. Adults
Meghan Zacher; **Samantha Brady**; Susan E. Short
Journal article · Journal of Health and Social Behavior · October 18, 2025 · doi:10.1177/00221465251371065

Abstract. Although prior research identifies many social determinants of dementia, few studies look upstream toward dementia's macrosocial correlates, and fewer still consider macrosocial conditions in early life. This study focuses on state policy contexts in adolescence and, specifically, on state policy liberalism, defined as the overarching conservative-liberal orientation of state policies. We link panel data from a nationally representative sample of 6,410 U.S. adults ages 65 to 80 in the 2000 wave of the Health and Retirement Study with longitudinal data on state policy liberalism extending back in time to when respondents were young. Discrete-time hazard models examine relationships between state policy liberalism and the development of dementia from 2000 to 2016. Results show that more liberal state policy contexts in adolescence are associated with lower dementia risk in older age.…

38. An Accessible Multifunctional System to Support Safe and Independent Aging in Place: Iterative Development and Qualitative Analysis
Céline Madeleine Aldenhoven; Matthew Charles Milton; **Lisa D'Ambrosio**; **Chaiwoo Lee**; Sophia Ashebir; Elisabeth André
Journal article · JMIR Aging · October 16, 2025 · doi:10.2196/72579

Abstract. Background: The global population of older adults is rapidly increasing, while the number of relative caregivers is declining. This creates a critical need for solutions that support caregiving and enable older adults to age in place while maintaining their independence. Many existing caregiving technologies focus on easing caregivers' burdens through surveillance-based systems, which often prioritize caregivers' needs over those of older adults. Such designs can unintentionally disempower older adults by devaluing their autonomy and decision-making capabilities. Objective: This study explored older adults' and designers' reactions to a technology-enabled system called LifeTomorrow that was built

by centering older adults as the primary users. The system aims to support their autonomy to make informed choices and their desire for independent living, while balancing their social and…

39. A data-driven and context-aware approach for demand forecasting in the beverage industry

Benedict Jun; **Ilya Jackson**; Maggie Huang; Sebastian Villegas; **Jaime Macias-Aguayo**

Journal article · International Journal of Logistics Research and Applications · October 10, 2025 · doi:10.1080/13675567.2025.2566806

Abstract. Accurate demand forecasting is essential for logistics and supply chain management as it enables efficient inventory planning, reduces operational costs, and ensures high service levels across the network. However, in practice, diverse demand patterns of items make this task challenging, and a one-size-fits-all forecasting approach is inadequate. This paper proposes a data-driven and context-aware forecasting framework and tests it by using both endogenous data from a large private-label beverage manufacturer and exogenous features (such as holidays and temperature). Our method begins by classifying SKUs based on demand volume, volatility, and intermittency, and then refining the derived clusters by taking volume distribution into account. Totally, we obtain four distinct clusters, which are (i) stable and high volume, (ii) stable with low volume, (iii) erratic and intermittent, and…

SEPTEMBER 2025

40. Type Enforced: A Python type enforcer for type annotations

Connor Makowski; Willem Guter; **Timothy Russell**

Journal article · The Journal of Open Source Software · September 30, 2025 · doi:10.21105/joss.08832

Abstract. type_enforced is a pure Python package designed to enforce type annotations at runtime without the need for a special compiler.It provides an intuitive decorator-based interface that allows developers to enforce explicit typing constraints on function and method inputs, return types, dataclasses, and class instances.The package supports a comprehensive set of Python's built-in types, typing module constructs (such as List, Dict, Union, Optional, and Literal), nested data structures, and custom constraints.By offering runtime validation of type annotations and constraints, type_enforced enhances code reliability, readability, and maintainability.

41. Analysis of Driver and Pedestrian Gesture Use in the Boston Area. Automated Vehicles May Need More Than Kinematics in Ambiguous Situations

Hatice Şahin İppoliti; Alexander Weibert; Dietrich Manstetten; **Bryan Reimer**; **Pnina Gershon**; **Bruce Mehler**; Larbi Abdenebaoui

Conference paper · venue not recorded · September 22, 2025 · doi:10.1145/3744335.3758515

Subject. *Human-Automation Interaction and Safety; Autonomous Vehicle Technology and Safety* · Keywords: *Kinematics, Pedestrian, Gesture, Motion (no abstract on record).*

42. Shaping In-Vehicle Behaviours through Activity-Centered Design

Ankit R. Patel; **Pnina Gershon**; Azra Habibovic; Fjollë Novakazi; Sakura Akahoshi; Areen Alsaid; Kyungjoo Cha

Conference paper · venue not recorded · September 22, 2025 · doi:10.1145/3744335.3749141

Abstract. AutomotiveUI Adjunct '25, Brisbane, QLD, Australia

43. Resilient Supply Chains Amid Uncertainty: Do Agility, Adaptability, and Alignment Mitigate the Effects of Major Disruptions?

Pier Paolo Patrucco; Vinícius Picanço Rodrigues; Jan C. Fransoo; **Christopher Mejía-Argueta**

Journal article · Journal of Business Logistics · September 17, 2025 · doi:10.1111/jbl.70037

Abstract. ABSTRACT Global supply chains are increasingly vulnerable to disruptions, underscoring the importance of effective resilience strategies. This study examines how agility, adaptability, and alignment (AAA capabilities) mitigate the negative impacts of major disruptions on corporate performance and influence capability enhancement during recovery. Using a longitudinal survey conducted across two phases of the COVID-19 pandemic, we find that agility significantly enhances resilience in conditions of high demand uncertainty, whereas adaptability is particularly effective under high supply uncertainty. Conversely, alignment demonstrates limited effectiveness during acute disruptions but remains critical for post-disruption collaboration and recovery. Interestingly, firms often respond to severe disruptions by broadly investing in all three capabilities, potentially overlooking their…

44. The flying sidekick traveling salesman problem with multiple drops: An effective heuristic approach

Sarah K. Schaumann; Abhishake Kundu; **Juan C. Pina-Pardo**; **Matthias Winkenbach**; Ricardo A. Gatica; Stephan M. Wagner; Timothy I. Matis

Journal article · Computers & Industrial Engineering · September 17, 2025 · doi:10.1016/j.cie.2025.111523

Subject. *Robotic Path Planning Algorithms; Vehicle Routing Optimization Methods* · Keywords: *Drone, Travelling salesman problem, Heuristic, Truck, Stylized fact (no abstract on record).*

45. Multi-Stage Stochastic Programming for Heavy-Duty Electric Truck Routing Under Public Charging Congestion Uncertainty

Ziyan Li; Nikolay Aristov; Antoine Germain; **Elenna Dugundji**

Conference paper · venue not recorded · September 15, 2025 · doi:10.1109/hpec67600.2025.11196671

Abstract. This study explores multi-stage stochastic optimization frameworks for routing heavy-duty electric trucks making long-haul deliveries, while dealing with uncertainty in public charging station congestion. We examine a multi-stage problem in which multiple vehicles share limited charging resources in a dynamic environment. Each decision stage corresponds to a distinct routing event, such as the arrival at a delivery location, with congestion levels at public charging stations progressively revealed. The key state variable is the vehicle's position, represented as integer indices based on predefined route sequences. These route sequences introduce global constraints that must be reconciled with the stage-wise independence assumption.To solve this integer-state problem, we compare two decomposition algorithms: Stochastic Dual Dynamic integer Programming (SDDiP) using strengthened Benders'…

46. Enhancing Sentiment Classification of E-commerce Reviews for Actionable Insights using LLMs

Kevin Power; Peter Harding; José Ángel Pérez López; Alex Carroll; **Elenna Dugundji**

Conference paper · venue not recorded · September 15, 2025 · doi:10.1109/hpec67600.2025.11196232

Abstract. This paper explores the use of Large Language Models (LLMs) and Natural Language Processing (NLP) techniques to enhance sentiment classification in e-commerce product reviews. We develop a pipeline that fine-tunes pre-trained transformer models, such as Bidirectional Encoder Representations from Transformers (BERT) and RoBERTa, for sentiment analysis, achieving high accuracy in multi-category classification. Additionally, we introduce a root-cause analysis model that leverages Deepseek-based labeling to classify low-rated reviews into predefined issue categories. By sequentially fine-tuning on a large dataset before domain-specific adaptation, we aim to improve model robustness and generalization. To capture evolving customer concerns over time, we apply a Poisson thinning method for temporal trend analysis of complaint categories. Our approach demonstrates the potential of LLMs for…

47. Predicting Ports Congestion by Utilizing State Space Models

Nikolay Aristov; **Elenna Dugundji**

Conference paper · venue not recorded · September 15, 2025 · doi:10.1109/hpec67600.2025.11196391

Abstract. Maritime port congestion poses significant risks to global supply chains, as ports handle over 80% of world trade by volume. Current congestion prediction methods struggle with the complex temporal dependencies inherent in port operations, limiting their effectiveness for proactive supply chain management. This study introduces state-space models (SSMs) to maritime logistics forecasting, proposing a novel architecture that combines input-adaptive dynamics with multidimensional temporal processing.We develop and evaluate three SSM variants using Automatic Identification System (AIS) vessel tracking data from 20 East Coast U.S. terminals: (1) Liquid-S4 with polynomial bilinear kernels for input-adaptive dynamics, (2) S4ND for multidimensional signal processing, and (3) Liquid-S4ND-PB—a novel combination extending liquid kernels to multidimensional state-space models for the first time.…

48. Innovative Longevity Design through Boundary Object Integration

Sheng-Hung Lee; **Joseph F. Coughlin**; **Alexa Balmuth**; Maria C. Yang

Journal article · Base Diseño e Innovación · September 15, 2025 · doi:10.52611/bdi.num11.2024.1197

Abstract. This descriptive study explores how Longevity Planning Blocks (LPBs) can serve as boundary objects to facilitate conversations and identify user needs in service design, thereby advancing the understanding of Design for Longevity (D4L) within financial planning, service innovation, and system design. Using constructivist grounded theory, we analyzed 69 one-hour in-person D4L service experiments with participants in Boston, USA, categorized by age: adulthood (25-54), pre-retirement (55-64), and post-retirement (65-84), with controls for gender balance, annual household income, savings, and investable assets. We identified six key considerations to improve the design of LPBs—adaptability, tangibility, modularity,

learnability, unpredictability, and scalability—based on six emerging themes as core codes and 11 codes, which include understanding individuals' needs, fostering point-to-talk…

49. Examining the contributions of demographic variables to vaccination uptake among the U.S. aged 50+

Alexa Balmuth; Taylor Brennan; Sophia Ashebir; **Lisa D'Ambrosio**

Journal article · ***Vaccine*** · *September 9, 2025* · doi:10.1016/j.vaccine.2025.127711

Subject. *Vaccine Coverage and Hesitancy; Influenza Virus Research Studies* · Keywords: *Vaccination, Ethnic group, Odds, Pacific islanders, Race (no abstract on record).*

50. Managing technology-related disruptions and vulnerabilities in highly automated warehouse systems: an integrative review and research agenda

Miguel Rodríguez-García; Joakim Kembro; **K.E. Betts**; **Eva Ponce-Cueto**

Journal article · ***International Journal of Production Research*** · *September 5, 2025* · doi:10.1080/00207543.2025.2552281

Abstract. Recent technological developments in warehousing have introduced new risks. This paper presents an integrative review that combines insights from highly automated warehouse systems (HAWS) and risk management, providing a comprehensive understanding of technology-related warehouse disruptions and vulnerabilities. We identify five major disruptions that can affect HAWS: cyberattacks, technology sabotage, technology failures, power and network outages, and human-machine interaction issues. Moreover, we identify 48 technology-related vulnerabilities across all disruptions. In particular, HAWS have become vulnerable to cyberattacks due to the increasing number of warehouse technology suppliers, greater complexity of multi-robot networks such as AMRs, reliance on cloud-based systems, and cascading effect of cyberattacks due to higher levels of interconnectivity in HAWS networks. Our review…

51. Defining Nanostores: Cybernetic Insights on Independent Grocery Micro-Retailers' Identity and Transformations

David Ernesto Salinas-Navarro; Eliseo Luis Vilalta-perdomo; Rebecca Herron; **Christopher Mejía-Argueta**

Journal article · ***Systems*** · *September 3, 2025* · doi:10.3390/systems13090771

Abstract. Nanostores—micro, independent grocery retailers—are often defined overlooking their socioeconomic roles and relational significance in favour of their primary functional aspects. To close this gap, this study adopts a systemic perspective to examine how multiple stakeholders (owners, customers, and suppliers) shape nanostore identity. Accordingly, this study proposes a framework of X-Y-Z identity statements, along with the use of the TASCOI tool, to examine nanostore descriptions and map their roles, expectations, and transformation processes. This systemic framework, rooted in management cybernetics, enabled the collection and analysis of 168 survey responses from 34 stores in Mexico City. The results show that nanostore identities are varied and context-dependent, operating as grocery stores, family projects, community anchors, economic lifelines, and competitors. This diversity…

52. Quantifying the Role of Kinematic and Behavioral Features in Driver-Pedestrian Interaction across Environments: An Inverse Reinforcement Learning Approach

T. Zach Noonan; **Pnina Gershon**; Josh Domeyer; **Bruce Mehler**; **Bryan Reimer**

Journal article · ***Proceedings of the Human Factors and Ergonomics Society Annual Meeting*** · *September 1, 2025* · doi:10.1177/10711813251370741

Abstract. This study examined real-world driver-pedestrian encounters to identify key interaction features and assess how the importance of these features is mediated by protection afforded by the environment. Using inverse reinforcement learning, we estimated the utility functions to evaluate the relative importance of different aspects of the interaction for each road user and how they differ between undesignated (e.g., jaywalking) and designated (e.g., zebra crossings) crossings. Pedestrian pausing behavior and dynamic features like acceleration changes and time gaps were important at designated crossings, whereas undesignated crossings relied on distances and bidirectional gaze, highlighting reliance on non-verbal cues. This work builds on previous studies analyzing the role of environmental features on interaction, communication, and negotiation between drivers and pedestrians. Understanding…

53. The Impact of Electrification and Partial Automation on Driver Speeding Behavior

Pnina Gershon; T. Zach Noonan; John Lenneman

Journal article · Proceedings of the Human Factors and Ergonomics Society Annual Meeting · September 1, 2025 · doi:10.1177/10711813251395046

Abstract. As electric vehicles (EVs) and partial automation systems become increasingly prevalent, their impact on everyday driving behavior remains underexplored. This study utilizes real-world naturalistic data to examine how vehicle type, an electric versus an internal combustion engine (ICE), and the use of partial automation are associated with speeding behavior. Data were collected from 24 drivers over the course of a month each, comparing Tesla Model 3s with Autopilot (EV) and Cadillac CT6s with Super Cruise (ICE), covering about 38,000 miles of driving. Results indicate that EV drivers tended to speed for shorter durations on arterial roads but exhibited higher speeding magnitudes on residential and controlled access roads after their first week of driving. Notably, driving with partial automation, regardless of powertrain, was associated with significantly longer speeding durations and…

AUGUST 2025

54. Enhancing Multi-echelon Home Improvement Supply Chain Responsiveness Through Machine Learning-Enabled Inventory Segmentation and Positioning

Edgar Gutiérrez-Franco; Pablo Blanco Medina; **Chris Mejia**

Conference paper · Communications in computer and information science · August 29, 2025 · doi:10.1007/978-3-031-98235-4_20

Subject. *Advanced Manufacturing and Logistics Optimization; Quality and Supply Management* · Keywords: *Supply chain, Computer science, Segmentation, Business, Artificial intelligence (no abstract on record).*

55. The Service Network Fleet Transition Problem

Jonas Lehmann; Anne Gvozdjak; **Matthias Winkenbach**

Journal article · Transport Economics and Management · August 23, 2025 · doi:10.1016/j.team.2025.07.003

Abstract. The road freight sector is a large source of carbon emissions yet notoriously hard to decarbonize. Logistics service providers and fleet operators face increasing pressure to adopt and implement carbon emissions reduction targets over the next years and decades. However, they lack appropriate tools to design and evaluate fleet transition strategies amidst competing technology alternatives, and the complexity of spatial and temporal cost differentials, along with intermediate emissions reduction goals. To address this, we introduce the Service Network Fleet Transition Problem to guide and facilitate companies' transitions towards low-carbon vehicle fleets and operations. We propose an efficient integer linear programming formulation to model and solve the problem, capturing critical real-world constraints such as fueling and charging infrastructure requirements and the geo-spatial…

56. Work In Progress: Torque, Engineering Students, and the Conceptual Shift from External to Internal Forces

Joseph F. Coughlin; Heather L. Johnson; D. C. Mays

Conference paper · venue not recorded · August 21, 2025 · doi:10.18260/1-2--57514

Subject. *Design Education and Practice; Mechanics and Biomechanics Studies* · Keywords: *Torque, Internal forces, Work, Computer science, Mechanical engineering (no abstract on record).*

57. Designing Competitive Nanostore Networks for Enhanced Food Accessibility: Insights from a Competitive Facility Location Model

Agatha Clarice da Silva-Ovando; Daniela Granados-Rivera; Gonzalo Mejía; **Christopher Mejía-Argueta**; Edgar Gutiérrez-Franco

Journal article · Logistics · August 19, 2025 · doi:10.3390/logistics9030118

Abstract. Background: Access to healthy food in emerging-economy cities is challenged by last-mile constraints and poor infrastructure. Aligned with the UN SDGs on Zero Hunger and Sustainable Cities, this study examines how a strategically located nanostores network can help close these gaps while fostering local resilience. Focusing on Colombia's Sabana Centro region, we designed a nanostore network that maximizes spatial coverage, proximity, and affordability. Methods: A competitive facility-location model combined with a discrete choice model captures consumer heterogeneity in price and location preferences. Results: Results show that locating nanostores in peripheral rather than central areas improves equity: the proposed network meets about 65,400 kg of weekly demand—51% fruit, 36% vegetables, 13% tubers—representing 16% of total regional demand and reaching underserved municipalities. This…

58. Innovators and Transformers: The challenges of warehousification: balancing logistics spatial needs with social and environmental sustainability

Angela Acocella; Frans Cruijssen; Jan C. Fransoo

Journal article · International Journal of Physical Distribution & Logistics Management · August 12, 2025 · doi:10.1108/ijpdlm-06-2024-0232

Abstract. Purpose We propose a framework focusing on logistics space in peri-urban regions and the associated planning decisions. Our approach explicitly incorporates social and environmental sustainability considerations to address growing concerns of large-scale warehouse spatial developments. Design/methodology/approach We conceptualize warehousification by combining the perspectives of logistics management and spatial planning research with examples of industry practice and develop a framework to deal with the associated challenges. Findings Challenges exist for policymakers and logistics practitioners attempting to mitigate the negative externalities of the growth in the development of big box warehouses (i.e. warehousification). While some mitigation strategies have been used in practice, they are not yet widespread. Research limitations/implications Both empirical and model-based research…

59. How to Automate Operations Without Breaking the Bank

Jaime Macias-Aguayo; **María Jesús Sáenz**; Duncan McFarlane

Journal article · MIT Sloan Management Review · August 11, 2025 · doi:10.63383/asvl4642

Abstract. Managers at small and midsize businesses may perceive automation as too expensive to be feasible, but research has identified strategies that make implementing it possible even on a tight budget. A framework for evaluating the five main factors that can reduce — or increase — the cost of an automation project can help leaders make more informed decisions about whether process automation might be a viable and cost-effective option for their company.

60. Behavior change associated with using partial automation among three samples of drivers during a 4-week field trial

Ian J. Reagan; Jessica B. Cicchino; Eric R. Teoh; **Pnina Gershon**; **Bryan Reimer**; **Bruce Mehler**

Journal article · Journal of Safety Research · August 3, 2025 · doi:10.1016/j.jsr.2025.07.001

Subject. *Human-Automation Interaction and Safety; Traffic and Road Safety* · Keywords: *Automation, Field trial, Human factors and ergonomics, Injury prevention, Field (no abstract on record).*

61. Oil body-based emulsion gels structured by OG:OB ratio and oleogelator concentration for use as margarine alternatives

Lijuan Han; Jinyu Chen; Li Wang; **Zhouqiao Zhao**; Hailong Zhang; Weinong Zhang; Shuyi Li

Journal article · LWT · August 1, 2025 · doi:10.1016/j.lwt.2025.118300

Abstract. Crude oil bodies (OBs) combined with β-sitosterol/γ-oryzanol oleogels (OGs) were used to develop structured emulsion gels (EGs) with potential as margarine alternatives. The effects of OG:OB mass ratio (0:10 to 10:0) and oleogelator (OGL) concentration (6-10 wt%) on phase structure and gel performance were systematically investigated. At 50-70% OG, EGs exhibited a phase shift from bicontinuous to water-in-oil (W/O) morphology, with improved elasticity, hardness, and shape retention -key attributes for margarine-like applications. Increasing OGL concentration led to denser droplet packing and stronger gel networks, as indicated by higher elasticity and yield stress. CLSM revealed that high OG or OGL levels disrupted OB interfacial membranes and promoted reorganization at the oil-water interface, contributing to structural transformation. Under 3D printing conditions, samples with a 7:3…

62. Toward a conceptual framework for AI and robotics in aging in place: insights from constructivist grounded theory

Sheng-Hung Lee; Devin Liddell; Maria C. Yang; **Joseph F. Coughlin**; Olivier de Weck

Journal article · Proceedings of the Design Society · August 1, 2025 · doi:10.1017/pds.2025.10326

Abstract. ABSTRACT: This descriptive study examines participant reactions to a new framework categorizing aging-in-place (AIP) services with AI and robotics through a think-aloud method. Using grounded theory, we examined older adults' perceptions of AI's role in promoting independence. The framework consists of four AI archetypes that address the cognitive and functional needs of the elderly with physical or digital interventions: Advisor AI, Burler Robot AI, Valet Robot AI, and Conductor AI. The authors conducted virtual interviews with four Boston-based retirees (mean age 70), revealing expectations and concerns regarding health monitoring, routine assistance, and social well-being. The findings emphasize

inclusivity, adaptability, and practical relevance for aging populations and underscore the importance of trust, lifestyle integration, and adaptability in fostering meaningful AIP…

JULY 2025

63. **Service outsourcing: The dilemma of third-party service providers**

Jie Wang; Benedict Jun; Yong-Hong Kuo; **María Jesús Sáenz**

Journal article · *Transportation Research Part E Logistics and Transportation Review* · *July 23, 2025* · doi:10.1016/j.tre.2025.104298

Subject. *Sharing Economy and Platforms; Outsourcing and Supply Chain Management* · Keywords: *Outsourcing, Dilemma, Service provider, Business, Service* *(no abstract on record).*

64. **Beyond the Counter: A Systemic Mapping of Nanostore Identities in Traditional, Informal Retail Through Multi-Dimensional Archetypes**

David Ernesto Salinas-Navarro; Eliseo Luis Vilalta-perdomo; **Christopher Mejía-Argueta**

Journal article · *Systems* · *July 5, 2025* · doi:10.3390/systems13070546

Abstract. This study examines the identity of nanostores—micro, independent grocery retailers—through a systemic, stakeholder-informed lens to promote their survivability and competitiveness. Moving beyond traditional operational descriptions, it introduces a multidimensional framework that examines what nanostores do (X), how they do it (Y), and why they matter (Z), which is complemented by the use of the TASCOI tool to produce identity statements. Based on survey data collection and a thematic analysis of nanostore stakeholder responses in Mexico City, the research categorises identity statements into six 2 × 2 matrices across four dimensions: operational, functional, relational, and adaptive. This analysis yields twenty-four archetypes that capture the diversity, complexity, and adaptability of nanostores. The findings reveal that nanostores are not a homogeneous category. They simultaneously…

65. **Measuring causal effects of disasters and consequent relief activity on truckload markets**

Shraddha Rana; **Jarrod Goentzel**; **Chris Caplice**

Journal article · *Transportation Research Part E Logistics and Transportation Review* · *July 3, 2025* · doi:10.1016/j.tre.2025.104271

Subject. *Infrastructure Resilience and Vulnerability Analysis; Facility Location and Emergency Management* · Keywords: *Forensic engineering, Engineering, Transport engineering, Economics, Business* *(no abstract on record).*

PART 3

Sponsored Research Activity

A Fifteen-Year Portfolio Overview, FY2012–FY2026

Source: MIT CTL cost-collectors · 364 awards · Fiscal years run 1 July – 30 June · All figures are authorized award totals

Executive Summary

Between FY2012 and FY2026 the Center for Transportation & Logistics executed 261 new sponsored research awards, engaging 38 lead researchers and 97 distinct sponsoring organizations. This part describes how that portfolio has evolved in volume, subject mix, funding sources and structure.

Four findings define the period:

Research activity has been remarkably stable. The value of the active research award portfolio, apportioned over each award's performance period, has held within a narrow band in every year of the window.

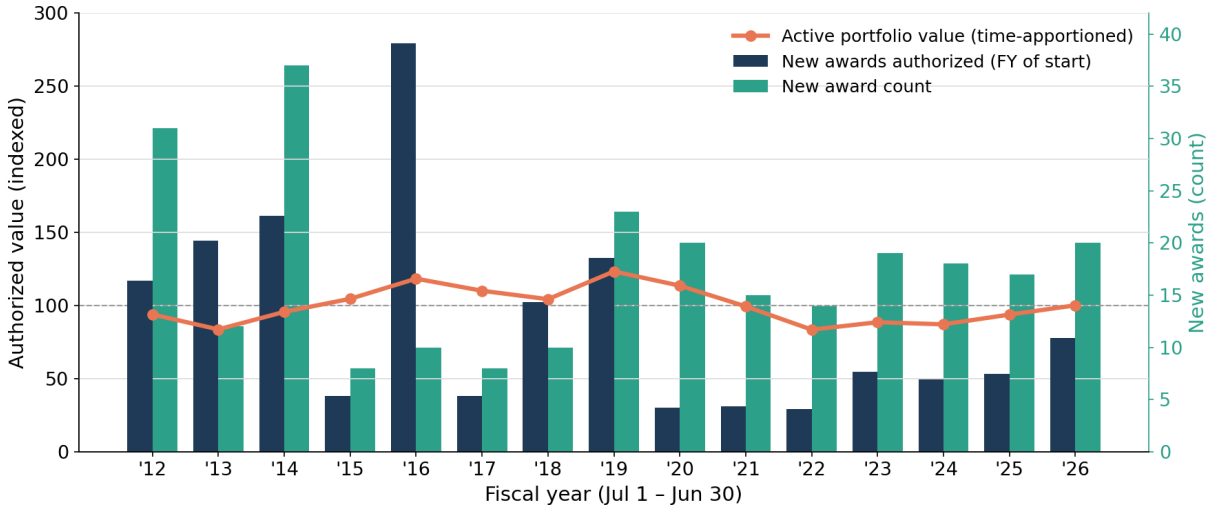
The funding base has shifted decisively from federal to industry. Federal and consortium sources supplied 77% of new dollars in FY2012–16; in FY2022–26 they supply 4%. Industry now funds 85% of new work. The Center replaced block funding with a broader, more commercial sponsor base — 43 distinct sponsors in the most recent era, 35 of them entirely new relationships.

The subject mix has rebalanced toward logistics, analytics and AI. Human-factors and driver-behavior research, once 54% of new award dollars, is now 22%. Research awards associated with freight and last-mile logistics, supply chain strategy, and AI/optimization methods together rose from 4% to 47% of the Center’s award portfolio value.

Projects are shorter and denser. Median duration fell from 4.0 years to 1.1 years as the multi-year block-funded vehicle gave way to compact, faster-turning industry engagements. The Center is doing comparably more intensive work on shorter clocks.

9. Evolution Over Time

Figure 7. Sponsored research volume by fiscal year, FY2012–26. To avoid disclosing absolute financial magnitudes, both dollar series are shown as an index on a common scale: 100 equals the average value of the active portfolio across FY2012–26 (dashed reference line). The new-award count (teal bars, right axis) is shown in absolute numbers.



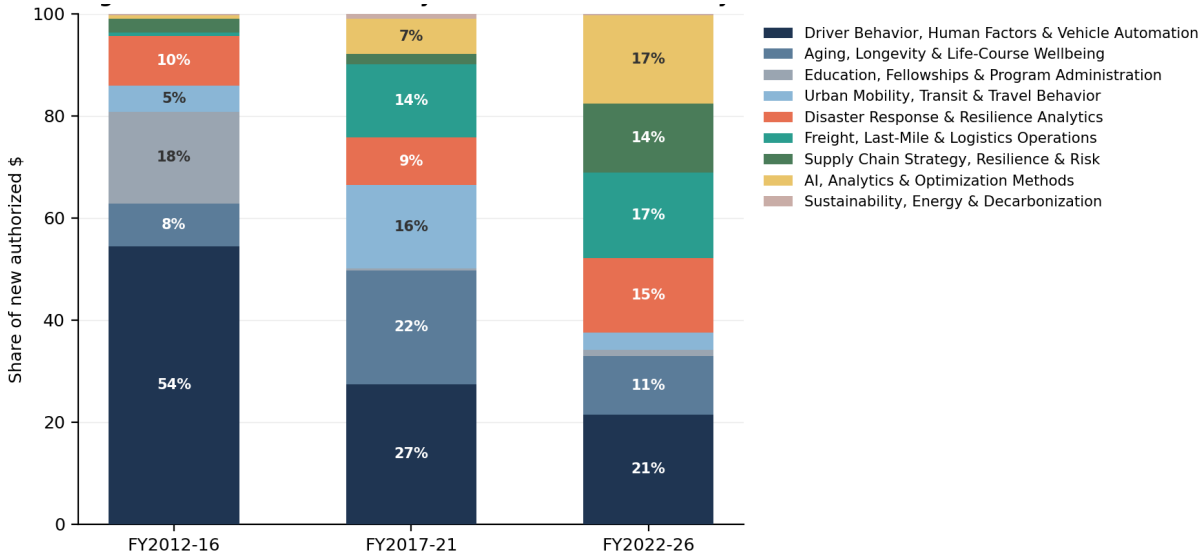
In Figure 7, the navy bars record new authorizations in the fiscal year an award began — the fundraising view, which is lumpy by nature because a single multi-year consortium lands entirely in one year. The teal bars count the new awards signed each year, a series that shows no downward trend: the Center is signing roughly as many projects per year today as it did a decade ago. The orange line apportions each award's value evenly across its performance period, approximating the research activity actually underway in a given year. That line is far steadier than either new-award series, holding within a narrow band in every year of the window with no year of collapse. The Center's research activity has been remarkably stable; what has changed is how that activity is procured.

The structure of the portfolio has changed alongside. Awards have become markedly shorter — the share running under one year rose from 13% in FY2012–16 to 41% in FY2022–26, while awards of three or more years fell from 54% to 10% — as the four- and five-year vehicles of the federal block-funding era were replaced by annual and sub-annual industry engagements, frequently structured as sequential renewals. The Center now runs a higher-throughput, faster-turning portfolio: more responsive to industry demand and better matched to fast-moving topics like AI.

10. Subject Areas and Topical Shift

Based on a very high-level analysis of Cost Collector Names and sponsor identities, each award was assigned to a primary subject area. Since the underlying keyword taxonomy was only applied to the award titles and sponsor names, this classification should be treated as indicative rather than authoritative — a handful of awards could defensibly sit in a neighboring category, and awards spanning two themes are counted once, under the dominant one. Regardless, the data reveals a significant structural shift in the subject mix of CTL's award portfolio.

Figure 8. Shift in the research subject mix of new awards across five-year eras, FY2012–FY2026. Awards are classified by their respective project titles; era shares are weighted by authorized award value, not by award count.



The focus of the Center's research awards has moved from a transportation–human-factors focus toward a logistics and decision-analytics focus. Three categories — freight/last-mile, supply chain strategy, and AI/optimization — accounted for 4% of new dollars in FY2012–16 and 47% in FY2022–26. This is the clearest topical signal in the data.

AI is now a first-class research subject, not a method footnote. Recent award titles name it explicitly: quantum computing for supply chains, GenAI and agentic systems, digital twin simulators, machine-learning benchmarks, AI for vehicle routing, and other awards. In the FY2012–16 era, effectively none of the portfolio was framed this way.

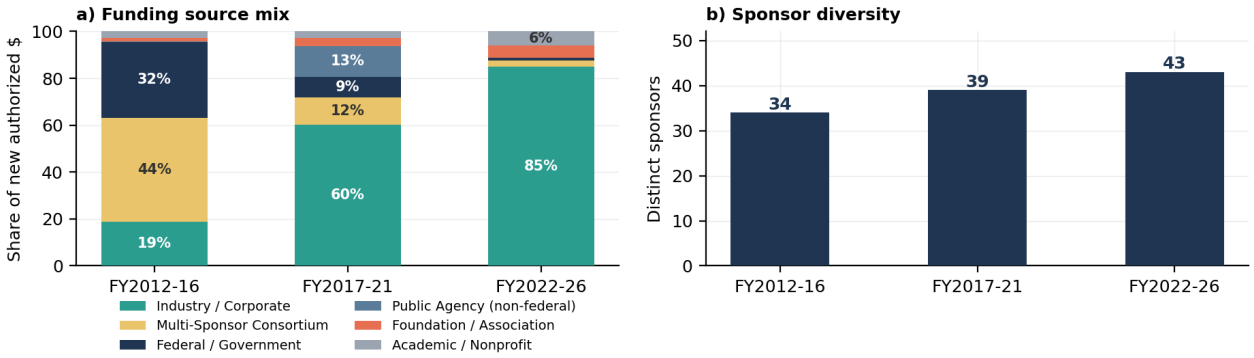
Human factors has narrowed but not disappeared. At 22% of recent dollars it remains the single largest category, and it retains blue-chip sponsors. What has gone is the federal UTC funding framework that once surrounded it.

Disaster response has quietly become a durable franchise. Event-triggered disaster-response activations have proven a recurring stream of sponsored work: individually small, collectively material, and sustained across a decade.

Sustainability is a clear growth opportunity. At under 1% of new award value in the most recent era, sustainability and decarbonization research remains largely untapped — a natural direction of further growth for a logistics research center in 2026.

11. Funding Sources

Figure 9. Funding sources of new awards are diversifying as federal funding recedes. Panel (a) shows the funding-source mix of new awards signed in each five-year era, weighted by authorized award value; panel (b) counts the distinct sponsors of those new awards in each era.



Funding has diversified across the portfolio. On an all-time basis the Center's sponsorship is concentrated in a small number of long-standing relationships; on new business since FY2022 it is not — recent awards are spread across a broad base of sponsors in insurance, financial services, automotive, consumer goods, energy and logistics, combining durable repeat-renewal relationships with many newer corporate partnerships.

Federal and consortium money supplied 77% of new authorized dollars in FY2012–16 and 4% in FY2022–26. The DOT UTC program alone accounts for 135 awards across the entire time horizon of this analysis. What replaced CTL's federal funding sources are broader and more commercial. Industry now supplies 85% of new dollars across 72 awards from 35 corporate sponsors in the current era (FY2022-26). Sponsor diversity has risen every era, from 34 to 39 to 43 distinct organizations, and 35 of the sponsors active in FY2022–26 are relationships that did not yield sponsored research in either prior era.

A base of 43 sponsors is structurally more resilient than dependence on a few federal programs, and the Center demonstrably moved from federal funding to industry funding while keeping research activity high (Figure 7).

Report Methodology & Caveats

The various parts of this report draw on different data sources with different limitations. Their respective caveats are reproduced here in full; no part's figures should be read without them.

Part 1 — Research output

Data source. All publication and citation data were drawn from OpenAlex, an open bibliographic database, in July 2026. Researchers were identified by ORCID where available and by verified OpenAlex author identifiers otherwise, to avoid conflating same-named individuals.

Scope. The analysis covers peer-reviewed journal articles and conference papers published 2010–2026. The 838 figure counts distinct publications; where multiple roster members co-authored a paper, it is counted once at the Center level.

Field-weighting. Field-Weighted Citation Impact (FWCI) and top-percentile classifications are OpenAlex's field- and year-normalized measures. An FWCI of 1.0 is the world average for the relevant field, year, and document type.

Conservative figures. Industry co-authorship is understated because some corporate partners are recorded under non-corporate affiliations. A small number of roster members whose identifiers were still being confirmed at the time of compilation contribute little or no counted output, so Center totals should be read as a lower bound.

Topic classification. Research themes are assigned algorithmically by OpenAlex and are best used for corpus-level patterns rather than fine claims about individual papers.

Part 2 — Publication catalogue

Data source. Publications were retrieved from OpenAlex by the ORCID or verified OpenAlex identifier of each roster member, then filtered to peer-reviewed journal articles and conference papers with a publication date between 1 July 2025 and the compilation date. Preprints, editorials, and book chapters are excluded, consistent with the center's main output analysis. A publication co-authored by several roster members is listed once. Because bibliographic indexing lags publication, the most recent weeks may be incomplete.

Author names. Author names shown in bold navy are CTL roster members; other co-authors are listed in plain text as recorded by the publisher.

Abstracts. Abstracts are reproduced as indexed by OpenAlex and lightly cleaned of markup; where no abstract is available, the OpenAlex primary research topic is given instead.

Part 3 — Sponsored research

Data source. MIT CTL cost-collector extract, 365 distinct awards.

Award figures. All values are authorized award totals, not recognized revenue, expenditures, or overhead-inclusive costs. They are nominal and not inflation-adjusted. 'New awards' are attributed to the fiscal year of the cost-collector effective date; the 'active portfolio' series apportions each award's authorized value evenly across the days of its performance period, which assumes a flat spend profile and will misstate front- or back-loaded projects.

Coverage and partial year. 103 awards have effective dates before FY2012 (the earliest, 1995) but remained active in the window covered by this analysis; they are included in all-time totals and in the active-portfolio series, and excluded from new-award analysis. FY2026 is a partial year — the latest effective date in the data is 11 May 2026 — so FY2026 new-award totals can still grow.

Subject classification. Assignments were derived from truncated Cost Collector Names using a keyword taxonomy with sponsor-informed disambiguation. It is indicative, not authoritative. Awards spanning multiple themes are assigned to a single dominant category, and a minority of assignments are defensible either way. The 'education, fellowships & program administration' category captures federal UTC administrative line items rather than a substantive research theme, and readers should net it out when comparing research subject mix across eras. Any conclusion resting on a single category boundary should be verified against untruncated project records.

What the data does not capture. The dataset records award value and lead-researcher attribution only. It does not capture co-investigators, so a named lead researcher may represent a substantially larger research team — and lead-researcher totals should not be read as a measure of individual contribution; it does not capture research output, quality, or student involvement; and it does not indicate whether awards were renewed, terminated early, or fully expended.