

Titles and Abstracts for AI-powered Automation in Ports

Erez Agmoni, Principal, Interwoven Ventures, and former Head of Maersk Innovation

The Cost of Standing Still: Why Ports Can't Stay the Supply Chain's Weak Link

Ports are no longer just points of entry and exit; they are now critical constraints on global supply chain resilience, economic competitiveness, and trade stability. As volatility increases across transportation networks, the cost of ports failing to modernize is no longer measured only in congestion or delays, but in cascading disruption across inventories, manufacturing, and downstream logistics.

In this session, Dr. Erez Agmoni will explore why ports cannot remain the supply chain's weak link, and what modernization looks like in practice. Drawing on real automation and AI success stories from his experience across supply chain operations, he will highlight where these technologies are delivering measurable impact today, what lessons ports can adopt, and why incremental pilots are not enough.

The talk will offer a forward-looking but grounded view of how intelligent automation, data-driven decision systems, and scalable operational redesign can unlock throughput, improve resilience, and ensure ports keep pace with the broader transformation of global logistics.

Bio:

Dr. Erez Agmoni is a venture investor and supply chain technology leader with more than 25 years of experience across logistics, robotics, AI, and industrial innovation. He is Co-Founder and General Partner at Interwoven Ventures, where he invests in startups building the next generation of automation and intelligent infrastructure for supply chains and industry. Previously, he served as Global Head of Innovation at Maersk, leading initiatives in robotics, digital technologies, and new operating models across global logistics networks. Erez works closely with startups, corporates, and research institutions to bridge emerging technologies with real-world operational challenges. He holds a PhD in Organizational Development and advanced degrees in engineering and telecommunications.

Kostas Bekris, Rutgers University

Panel: AI at an Inflection Point

Bio:

Kostas Bekris is a Professor of Computer Science at Rutgers University and an Amazon Scholar with Amazon Robotics. He is working in AI for Robotics, where his group is developing algorithms for robot planning, learning and perception especially in the context of robot manipulation, dealing with significant dynamics and for novel soft, adaptive mechanisms. Applications include logistics and manufacturing, as well as field robotics. He has served as Program Chair for selective robotics conferences, the "Robotics: Science and Systems" (RSS), as

well as the World symposium on the Algorithmic Foundations of Robotics (WAFR). He currently serves on the RSS Foundation Board. His research has been supported by NSF, DHS, DOD and NASA, including a NASA Early Career Faculty award.

Johannes Berg, Director of Corporate Affairs, Hamburger Hafen und Logistik AG

Harnessing the Power of Networks through Investment in Automation, Digitalization and Sustainability

The presentation by Johannes Berg provides strategic and operational insights into how Hamburger Hafen und Logistik AG (HHLA) is investing in automation and digital capabilities across its port terminal operations in Hamburg and other European locations. It highlights how both greenfield and brownfield projects contribute to increased efficiency and environmentally sustainable seaside and hinterland logistics processes. Particular attention is given to shoreside and hinterland automation initiatives at Germany's largest container terminal, Container Terminal Burchardkai in Hamburg, as well as to the introduction of remotely operated gantry cranes at HHLA's Hamburg terminals.

Bio:

Johannes Berg is Director of Corporate Affairs at Hamburger Hafen und Logistik AG (HHLA). In this role, he is responsible for developing and implementing strategies to represent the company's economic and political interests vis-à-vis business, politics, and society. As a member of HHLA's strategy team, he actively helps shape the future of one of Europe's leading logistics companies.

Previously, he served for over five years as Managing Director responsible for establishing the Digital Hub Logistics & Commerce in Hamburg—part of the de:hub initiative of the German Federal Ministry for Economic Affairs—and developed it into one of the leading innovation ecosystems for startups in the logistics sector. The hub is also supported by the European Commission as a European Digital Innovation Hub (EDIH).

Johannes Berg studied International Relations in Dresden, Mexico City, and Kaliningrad. He holds an Executive MBA in Innovation Management from the Vlerick Business School (Belgium) and Stellenbosch University (South Africa). His professional experience includes positions as an economic adviser in Brussels, the Netherlands, and Ukraine. He serves as a board member of the Port of Hamburg Marketing and is member of the Committee of Innovation and Digitalization of Chamber of Commerce in Hamburg.

He lives in Hamburg with his family, is the father of a son, and an avid cyclist.

Sophie Broere, TU Delft, AI port Center, TU Delft & Erasmus University, SmartPort, Rotterdam and **Tim Meijster**, TU Delft, AI Port Center, TU Delft & Erasmus University

AI and Digital Transformation in the Port of Rotterdam: Building a Smarter, Sustainable Ecosystem

In this contribution we will give an overview of Port of Rotterdam innovation ecosystem. We will discuss the role of SmartPort and AI Port Center in the research and innovation activities related to the port ecosystem. We will also give some insight into the instruments they use and possibilities to work together on research and innovation internationally.

Next we will discuss some of the key developments that have been happening in the Rotterdam area with respect to AI and Digitalization. The maritime and port industry is undergoing (rapid) transformation both related to and driven by digitalization and artificial intelligence (AI). AI Port Center and its many partners in the Rotterdam Port, investigate together how AI can enable smarter, more sustainable port ecosystems while faced with challenges like the energy transition, modal shifts, and operational resilience.

We will share some examples of AI-enabled systems, such as digital twins, edge AI, and generative/agent AI, that might support transitions and make the Port of Rotterdam more efficient in competitive. We will touch upon topics like carbon reduction strategies, showing some anticipated results of the Port Call Zero project. We look how digital technology and AI may impact the future of work in the Port. We will discuss several real-world examples and catalyzer projects initiated by the AI Port Center. For example, on disruption management through hybrid simulation and optimization models and synchromodal transport planning and on the use of LLM in the marine industry to preserve maritime engineering knowledge with AI and explore GenAI potential.

This session will address foundational aspects like data quality, data sharing mechanisms and federated learning and show examples on how we facilitate this, for example through development of the port call datahub. We will also briefly touch upon topic related to explainability of AI (XAI) and responsible use of AI, which are both key criteria for successful AI adoption.

This talk aims to inspire collaboration between industry, academia, and policymakers to harness AI for operational efficiency, sustainability, and resilience in the port ecosystem.

Bio: Sophie Broere

Sophie is Innovation Manager AI, Ports and Maritime at TU Delft and Project Developer Smart Logistics at SmartPort, where she leads initiatives that drive digitalization and sustainability across the port and logistics sector. With a foundation in civil engineering and early experience in a sustainability-focused start-up, she combines technical expertise with an entrepreneurial mindset. Her work centers on sustainable logistics, AI adoption, and the integration of advanced technologies into real-world maritime operations. By connecting academic research with industry challenges, she helps shape smarter, cleaner, and more resilient logistic & port operations for the future.

Bio: Tim Meijster

Tim works as an Innovation Manager Artificial Intelligence at the Delft University of Technology. In his role he brings together his experience working over 20 years in (digital) innovation in both academic & applied research and corporate environment. In his current role he identifies opportunities of AI, and drives change by building public-private partnerships. One of his key strengths, developed through his work in different professional environment, is to

bring solutions from (scientific) concept to deployed product. Tim works across various technology and industry domains with a focus on Port & Maritime and High-tech industry. Besides his work as an Innovation Manager, Tim is also a passionate entrepreneur, with his company he realizes solar-energy project in Ghana for SME's and public institutions.

Alex Carroll, MIT

Panel: AI at an Inflection Point

Bio:

Alex Carroll is a doctoral researcher at MIT's Center for Transportation and Logistics, where his work sits at the intersection of agentic AI, reinforcement learning, and maritime logistics. His research includes deep RL-based dynamic pricing for Mississippi River container barge services and AI-powered automation in port and intermodal systems. He is currently building modular multi-agent retrieval architectures for supply chain decision support, with an emphasis on auditable, governance-first AI. Alex holds an MIT Master of Applied Science in Supply Chain Management and brings industry experience from Amazon Logistics in Tokyo, Flock Freight, Zillow, and Arrive Logistics, where he built and deployed pricing and analytics systems at scale.

Charlie Collins, Arcadia Impact

Panel: AI at an Inflection Point

Bio:

Charlie Collins is a former UK diplomat who became involved in AI incident monitoring (volunteering for the AIAIC Repository) while emigrating to New York in 2022.

Educated as an engineer, Charlie believes incident data has potential as a practical, non-partisan tool for understanding and communicating the harmful effects of AI.

Charlie's current work with the Arcadia Impact Winter Fellowship (in partnership with the AI Incident Database and MIT AI Risk Repository) seeks to unlock that potential by developing methods for estimating how AI incidents are changing over time.

In his former career, Charlie represented the UK at the UN Security Council in New York, won a national award for work protecting critical national infrastructure and helped coordinate crisis response for terrorist attacks in Algeria, Mali, Egypt, and Nigeria.

Elenna Dugundji, MIT Center for Transportation and Logistics

AI-powered Maritime Logistics at Port of New York/New Jersey

This study employs a calibrated discrete-event simulation model to evaluate the operational impacts of modal shift interventions at the Port of New York/New Jersey. Building upon a previously published methodological framework, we conduct comprehensive baseline and scenario analyses to quantify how changes in truck-rail modal split affect port congestion, container dwell times, and yard utilization. Systematic scenario testing across rail adoption rates from 5% to 40%, combined with variations in train frequency and capacity, demonstrates that strategic modal shifts can reduce average container dwell time by over 10 hours. However, beyond 25% adoption without infrastructure scaling, rail itself becomes a bottleneck. These findings provide actionable insights for port authorities and policymakers considering intermodal interventions, demonstrating that existing rail infrastructure possesses untapped capacity that, when strategically utilized, can improve port performance.

The work to be described was joint with Kevin Power, Yassine Lahlou-Kamal, Nikolay Aristov, Thomas Koch.

Bio:

Elenna Dugundji is Director of the Deep Knowledge Lab for Supply Chain and Logistics and a Research Scientist at the MIT Center for Transportation and Logistics. shapes Supply Chain futures by bringing expertise in demand forecasting, machine learning and AI to research in mainport logistics, involving Network analytics, Optimization of operational processes, Tactical planning and Strategic asset management.

Alston Ghafourifar, Entefy

Panel: AI at an Inflection Point

Bio:

Alston Ghafourifar is a Silicon Valley entrepreneur and a published inventor. As CEO and Co-Founder of Entefy, he leads the global technology team that drives AI innovation from original research and IP creation to full commercialization with Fortune 500 enterprise customers. To date, Alston has been awarded 55 patents by the USPTO, covering a number of technical fields including multisensory AI, agentic model orchestration, universal interaction, privacy-preserving machine learning, blockchain, as well as core paradigms and frameworks for agentic AI. Alston has been a speaker and guest lecturer at several universities including UC Berkeley, Stanford, and MIT on a variety of topics such as the future of machine intelligence, enterprise AI, and innovation-led ventures.

Joshua Hirschheimer, Partner, Porsche Consulting Inc.

From Strategic Vision to Smart Implementation for AI-Driven Automation in Modern Ports

AI and automation are reshaping how ports manage cargo, optimize operations, and unlock capacity without expanding physical footprint. Josh Hirschheimer, Partner at Porsche Consulting for the Transportation practice, will lead this session explaining how ports can realize maximum

value from technology from defining a clear North Star vision, prioritizing high-impact use cases, and executing strong collaboration between operators and technology providers. Attendees will learn how a structured approach—from strategic vision to smart implementation to realize full ROI—translates innovation into measurable operational and financial gains.

Bio:

Joshua Hirschheimer is a Partner in Aerospace & Transportation at Porsche, where he focuses on elevating passenger, cargo, and logistics operations across the global mobility ecosystem. He blends industry expertise with cutting-edge digital and AI-driven solutions to help organizations modernize operations, accelerate decision-making, and unlock new sources of efficiency and sustainability.

Joshua is known for integrating advanced analytics, automation, and emerging technologies into aviation and transportation networks—supporting initiatives ranging from predictive maintenance and MRO optimization to digital twins, smart logistics, and next-generation customer experience design. He frequently works with cross-functional teams to drive Smart, Lean, and Green transformations that strengthen performance while advancing long-term environmental goals.

Within Porsche, Joshua has served as Aerospace, Transportation & Logistics Practice Lead and Senior Manager for Aerospace & Mobility. In these roles, he acted as a strategic partner for clients, oversaw major transformation programs, shaped new service offerings, and helped expand the firm’s footprint in aviation and travel operations.

Before joining Porsche, Joshua held multiple leadership positions at Sabre, including Senior Principal and Director of Operations Research & Data Strategy. His work supported mission-critical systems for the global travel sector—spanning passenger reservations, revenue management, network and flight operations, and crew optimization. He has deep experience applying technology, data, and AI to solve complex operational challenges across airlines, airports, cruise lines, and logistics providers.

Markus Horschig, Head of Critical Infrastructure, Port of Hamburg Authority

AI-Enhanced Critical Infrastructure Protection: Digital Twins & Intelligent Structural Inspection for the Port of Hamburg

Protecting and strengthening the resilience of critical port infrastructure requires new digital and AI-driven approaches. This presentation outlines how the Hamburg Port Authority (HPA) integrates Digital Twins with a structured, scalable AI strategy for structural inspection to enable data-driven, future-ready asset management.

Building on BIM-based object twins and a system-level Digital Twin that consolidates monitoring data, inspection results, roadway assessments, and document repositories, HPA has established a secure, cloud-first data foundation for AI-enabled decision-making.

At the core is a dedicated AI framework for structural inspection with a clear ambition: by 2030, AI-supported decisions will be standard practice across HPA. The framework defines measurable objectives—such as automating up to 80% of core inspection processes and reducing manual effort by 50%—while ensuring compliance with cybersecurity standards and the EU AI Act. A defined governance model, role structure, and roadmap provide the basis for safe and reliable AI deployment.

A modular, layer-based architecture—spanning data integration, annotation, model training and serving, and application layers—enables the scalable integration of diverse data sources, including drones, robotic systems, thermal imaging, ultrasonics, and manual inspections. Structured metadata management and a Data Lake/Lakehouse approach ensure high-quality inputs for machine learning models.

Initial use cases include automated crack detection, cross-asset damage classification, and a domain-specific “Bauwerks-GPT” that allows conversational access to asset information. Embedded directly into Digital Twin interfaces, AI outputs become actionable within inspection workflows.

Through an agile delivery model that unites R&D, domain expertise, and cloud-native engineering, HPA continuously refines models using MLOps, monitoring, and retraining cycles. This human-in-the-loop approach ensures that AI enhances—rather than replaces—the engineering judgment essential for safeguarding critical infrastructure.

Bio:

Markus Horschig is a specialist in the protection of critical infrastructure, with expertise spanning both cyber and physical security. Since April 2023, he has served as Head of Critical Infrastructure Protection at the Hamburg Port Authority, where he ensures compliance with legal and regulatory requirements for the Port of Hamburg, particularly in the areas of KRITIS and information security.

Before joining HPA, Markus was part of the DACH and German senior leadership teams at Insight, holding positions including Head of LCS DACH and Head of LCS for Germany and Austria. His earlier career includes roles in IT and license management at GlaxoSmithKline and Fairpro GmbH, as well as experience as a Java developer at MATHEMA AG.

Geraldine Knatz, Retired Executive Director of Port of LA, USC

Drivers and Benefits of Automation: Global Insights from Container Terminal Operators.

This presentation identifies and analyzes the relative importance of the multi-faceted factors that drive the decision to automate container terminals and the realized benefits, thus establishing how accurately terminal operators predicted the benefits of automation. The empirical analysis relies on a survey-based approach and the input of senior representatives of terminal operating entities.

Bio:

Geraldine Knatz is Professor of the Practice of Policy and Engineering, a joint appointment between the University of Southern California's School of Public Policy and the School of Engineering. She served as the first female Director of the Port of Los Angeles from 2006 to January 2014 and prior to that was Managing Director at the Port of Long Beach. Knatz had a significant impact on the maritime industry by creating and implementing the San Pedro Bay Ports Clean Air Action Plan. In 2014, she was elected a member of the National Academy of Engineering (NAE) in recognition of her international leadership in the development of environmentally clean urban seaports, and she currently serves on the NAE Council. That same year, she was honored with Containerization & Intermodal Institute's Lifetime Achievement Award. An author of several books about Los Angeles Harbor, Knatz's career has been featured in several popular books, most notably in Pulitzer Prize-winning journalist Edward Humes's *Door to Door*, David Helvarg's *The Golden Shore*, Bill Sharpsteen's *The Docks* and Kat Kanowicz's *Chasing Zero*.

Thomas Koch, Postdoctoral Associate, MIT Center for Transportation and Logistics

Title: From Data to Decision: MIT Research on Port Congestion & Supply Chains for FLOW

This talk presents research conducted at MIT on modeling maritime logistics and intermodal container flows, as well as related work performed as an ORISE Research Fellow supporting the US Department of Transportation FLOW initiative. Port operations are vital in global supply chains, with U.S. ports handling 70% of the nation's trade by weight and 40% by value. Given its importance, accurate demand forecasting for ports is necessary for efficient planning and operational improvements. Machine learning (ML) models, especially Long Short-Term Memory (LSTM) neural networks, have emerged as powerful tools for time series forecasting in this domain. While most prior studies focused on single-port forecasting, this study explores the application of a sequence-to-sequence LSTM model for multivariate forecasting across multiple ports and commodities. Using data from the U.S. Census Bureau (2003-2024), the study trained and validated a LSTM model to predict container throughput at eight major U.S. ports, covering 776 port-commodity combinations. The model outperformed traditional methods like linear regression, random forest, and gradient boosting, reducing forecasting errors by 6% overall. It also proved effective as multi-period forecasting technique, providing accurate predictions up to three months in advance.

Bio:

Thomas Koch is a Postdoctoral Associate at the MIT Center for Transportation & Logistics, where he works with the U.S. DOT on the FLOW project to enhance freight and maritime efficiency. Combining a Ph.D. in multimodal transport with expertise in high-performance computing and predictive modeling, he develops scalable, data-driven solutions for complex supply chain challenges. His work focuses on integrating real-time analytics and geospatial data to improve visibility and resilience across global transportation networks.

Stephen Lyman, Port of New York and New Jersey

Panel: Ports at the Crossroads: Scaling Automation and AI Without Disrupting Operations

Bio:

Stephen Lyman is the Executive Director of the Maritime Association of the Port of New York and New Jersey, President of MISNA, and Vice President of NAMO. With a career spanning operations, advocacy, and leadership across the maritime sector, he plays a key role in advancing one of the nation's busiest port regions. He is also a voting member of the Hudson Canyon Marine Sanctuary Advisory Council, a member of the Harbor Safety Committee National Steering Team and holds advanced credentials in nonprofit management and maritime port operations.

Jean-Paul Rodrigue, Professor of Maritime Business Administration, Texas A&M - Galveston

Container Terminal Automation: Diffusion Trends and Patterns

Despite the standardization enabled by containerization, container ports exhibit significant diversity in their sites, layouts, equipment, and operations. Terminal automation has further expanded this diversity, creating a landscape of facilities that use various stacking and horizontal movement technologies. Automation is also not a straightforward concept, as it can involve different levels of automation, ranging from equipment deployment (such as automated stacking cranes) to information technologies (such as appointment systems). The presentation investigates the main physical and operational characteristics of automated container terminals. What are the typical contexts and profiles of automated terminals, and what are their most significant impediments? It includes a detailed analysis of a geodatabase that includes a large share of the world's container terminal facilities.

Bio:

Dr. Rodrigue's research interests mainly cover transportation and economics as they relate to logistics, intermodal transportation, and global freight distribution. He has published extensively on topics, including maritime transport systems and logistics, global supply chains, gateways, and transport corridors. He has authored 9 books, 40 book chapters, more than 60 peer-reviewed papers, numerous reports, and delivered more than 200 conferences and seminar presentations, mostly at the international level. He ranks among the top 2% of the most cited scholars in the world and among the top 100 in the field of transport.

Anne Strauss-Wieder, Senior Freight and Logistics Executive and Rutgers University Lecturer

Collaborate, Coordinate, and Communicate: Preparing For and Managing Through Disruptive Events

Maritime cargo movements are often part of multimodal supply chains, particularly in international corridors. This presentation discusses how disruptive events are characterized

within a supply chain context, provides several examples of disruptive events and impacts, and articulates some of the approaches for managing through disruptive events.

Bio:

Anne Strauss-Wieder is a nationally respected senior executive with over 45 years of public and private sector experience involving supply chains, industrial and economic development, resilience, and freight movement. She was the 2022 recipient of the Transportation Research Board's (TRB) Thomas B. Deen Distinguished Lectureship. Strauss-Wieder has served in leadership roles in several national professional organizations. She was an appointed member of the U.S. Department of Commerce's advisory committee on supply chain competitiveness and the U.S. Maritime Administration's marine transportation system national advisory committee. She is a Senior Freight and Logistics Researcher and teaches a graduate class on freight and public policy at Rutgers. Strauss-Wieder has a Master's in regional science from the University of Pennsylvania and was a 2010 Lead New Jersey Fellow.

Erwin Verstaelen, VP Innovation Port of Antwerp-Bruges

Keynote: The Emerging Smart Port and the Enabling Role of AI

Ports around the world are transforming themselves to become smart. But what does that mean and why does it matter? Where does digital transformation, innovation and AI play a tangible role in all of this. Erwin Verstraelen, Vice President innovation, will take you on a journey through the last 7 years, a period that transformed the port of Antwerp-Bruges into an open innovation platform, resulting in many first of a kind in a port context.

Bio:

As Vice president innovation, Erwin and his team transform the port into an innovation hub where the market readiness of promising tech such as drones, smart camera's, autonomous ships and digital twins has been field tested and implemented over the past 5 years. They are building blocks of the emerging smart port. Smart also means resilient in turbulent times, being able to absorb disruptions and emerge stronger.

He is also deeply involved in the Beacon, an ecosystem focusing on Internet of Things use cases, where startups, scaleups, academia and applied research come together. Erwin is also board member of several organizations and a well-respected keynote speaker.

What characterizes Erwin is a self-made quote: In life there are problems, challenges and opportunities. That's actually three times the same thing, only the mindset is different.

Doug Vogt, North Carolina State Ports Authority

Panel: Ports at the Crossroads: Scaling Automation and AI Without Disrupting Operations

Bio:

Doug Vogt was appointed Chief Operating Officer of the North Carolina State Ports Authority in November 2020.

In this role, Vogt leads operational strategy and execution across North Carolina's port system, including the Port of Wilmington, Port of Morehead City, and the Charlotte Inland Port. He is responsible for directing and coordinating all terminal operations, overseeing information technology system implementation and enhancements, and managing the execution of the Ports Authority's infrastructure investment initiatives. His leadership focuses on driving operational excellence, efficiency, and long-term growth across the state's maritime gateways.

Vogt brings more than 25 years of experience in the maritime and logistics industry, having held senior leadership roles in port operations across multiple U.S. locations. Prior to joining North Carolina Ports, he served as Vice President of Operations, Maintenance, and Equipment for Tropical Shipping in Riviera Beach, Florida. Earlier in his career, he held positions with NYK Line in Atlanta, Georgia; APM Terminals in Long Beach, California; and Maersk Container Service Corporation in Charlotte, North Carolina.

He earned a bachelor's degree from the United States Merchant Marine Academy and an MBA from the University of Scranton, with specializations in Operations Management and Human Resource Management.

Vogt resides in Wilmington, North Carolina, with his wife, Julia, and their two daughters, Ruby and Charlotte.

Jingjin Yu, Associate Professor of Computer Science, Rutgers, and Director of Algorithmic Robotics and Control Lab

Algorithmic Foundations Enabling Scalable High-Density Logistics

Modern logistics hubs, from automated warehouses to maritime ports, are increasingly reliant on dense, high-capacity storage systems to manage global commerce. As automation advances dramatically in these facilities, a fundamental challenge remains: maximizing robot/storage density without sacrificing operational throughput. This talk explores how new algorithmic frameworks address these critical bottlenecks by enabling efficient, large-scale robot coordination in environments with extreme occupancy.

Bio:

Jingjin Yu is an Associate Professor in the Department of Computer Science at Rutgers University–New Brunswick and Director of the Algorithmic Robotics and Control Lab. He earned his B.S. from USTC, M.S. and Ph.D. degrees from UIUC, and completed his postdoctoral training at MIT CSAIL. His research advances embodied intelligence by integrating robot learning with algorithmic planning and combinatorial optimization to master complex manipulation and multi-robot coordination tasks. His work supports autonomous systems in warehouse logistics, home automation, and space environments. A recipient of the NSF CAREER and Amazon Research Awards, Dr. Yu has published 100+ peer-reviewed articles and currently serves as an ICRA Editor and IEEE RAS Distinguished Lecturer.
