Smart Cycling Conference 2026 and the NECTAR workshop

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Summary Report

By Dr. Keren-Or Grinberg-Rosenbaum

I was honored to present my research at the Smart Cycling Conference 2026 and the NECTAR workshop at Twente University, which was part of my PhD discretion. My paper, "Predicting Public Transport Resilience to Climate Extremes: A Hybrid Dynamical Systems Thinking Approach," was co-authored with my PhD supervisors: Prof. Yoram Shiftan (Technion - Israel Institute of Technology, Israel), Prof. Francisco Camara Pereira (Technical University of Denmark, Denmark), and Dr. Bat Hen Nahmias-Biran (Tel Aviv University, Israel). The 30-minute presentation in Session "Data and detection for safety" generated valuable feedback from the international research community and opened pathways for future collaborations with fellow PhD researchers.

My presentation shared insights on evaluating policy interventions that sustain cycling usage for resilient and sustainable urban mobility. Our research examines how infrastructure and policy interventions influence ridership levels under extreme climate conditions, offering a new perspective on infrastructure resilience and its benefits for users. Using multi-year data from New York City's Citi Bike system, the study introduces a systems-thinking framework based on Object-Process Methodology (OPM) to model causal relationships among environmental stressors (heatwaves, storms, cold spells), cycling infrastructure, and rider behavior. This framework embeds a policy logic layer that enables the systematic evaluation of interventions, not only in terms of safety or accessibility, but also their capacity to maintain or enhance ridership during adverse weather, a critical indicator of the robustness of urban cycling systems. Empirical analysis identifies significant spatial spillover effects, where improvements at specific stations generate ridership gains in adjacent areas. By incorporating causal logic directly into the model, planners can simulate "what-if" policy scenarios, projecting ridership responses to new protected lanes, station expansions, or comfort amenities before implementation. Graph neural networks further uncover how benefits "ripple" across space, strengthening system-wide resilience. Beyond its empirical results, the study contributes to the advancement of Explainable AI (XAI) in transport policy. The integration of systems thinking with machine learning transforms opaque predictive models into interpretable, policy-relevant tools, showing not only that an intervention works, but why, where, and under what conditions. This transparency is essential for building trust and ensuring equitable, climate-adaptive cycling strategies.

The conference's emphasis on cycling aligned perfectly with our research objectives, validating the relevance and timeliness of our approach. The experience reinforced

the importance of data-driven methodologies in transportation research and demonstrated the competitive advantage of approaches that integrate systems thinking with empirical data analysis over traditional survey-based methods.

The journey to this conference was far from simple and thus not taken for granted by my side. There were many doubts weathers I will be able to attend it due to cancellation of flights. I am thankful for the support given to me by ISTRC that enabled it to be considered from the first place. I feel that during these times it is important for Israeli researchers to continue and advance science and collaboration and I am thankful I was able to take part in this gathering in Holand.

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