

Participation at the 2023 Robotics Science and Systems Conference

I had an amazing experience participating in the Robotics Science and Systems (RSS) Conference in Daegu, South Korea and presenting my research as part of the 2023 RSS Pioneers workshop as well as during the main RSS conference. I would like to express my deepest gratitude to the Israeli Smart Transportation Research Center (ISTRC) for awarding me the ISTRC Summer 2023 Conference Grant and enabling me to attend the conference, and thus represent myself, the Technion and the state of Israel in this important conference.

The Robotics Science and Systems conference is one of the top international robotics conferences. The participants of the conference come from different robotics and autonomous systems disciplines, and many works in the conference investigated interesting research concerned and connected to smart transportation. The conference was held for 6 days and there were more than 800 attendees from dozens of countries. I was the only Israeli researcher that was selected to present my work at the conference.

The research I presented in the conference concentrates on algorithms for safe and efficient multi-agent team cooperation under uncertainties. It mainly addresses a topic paramount for the advancement of large-scale traffic management algorithms for autonomous vehicles by discussing urban air traffic management algorithms for futuristic autonomously flying vehicles by considering interactions between vehicle-like agents. The term agent refers to an entity moving in the environment such as a vehicle. The methodologies I investigate may be applicable to traffic management of autonomous ground vehicles as well.

Recently, there has been immense interest in using unmanned aerial vehicles (UAVs) for various commercial operations, such as package delivery, first responders, and fast disaster response. As a result, UAV traffic management systems are needed to support potentially thousands of UAVs flying simultaneously in the same airspace, in order to ensure goal-oriented behavior such that safety requirements are met.

In the future, many flying cars will shuttle and transport people and goods from one place to another while operating in a potentially congested, tight and packed airspace. Such management systems are essential to provide safety and coordination between vehicles moving along unstructured and dynamic routes that may intersect each other.

My work seeks to develop algorithms that should allow provably safe management of large numbers of flying vehicles in a shared airspace by enabling vehicles to reach their destinations while optimizing the overall flow of the transportation network, and while adhering to strict safety requirements.

During the conference I also participated in the 2023 RSS Pioneers workshop since I was selected as a recipient of the 2023 RSS Pioneers Award. The award is awarded each year to a

cohort of the world's top 30 early-career robotics researchers in a dedicated workshop that aims to foster creativity and collaborations surrounding challenges in all areas of robotics. During the workshop I presented my research in an oral talk, that showcased the important smart transportation research performed in Israel. The workshop included talks from leading international researchers from academia and the industry and provided an opportunity to meet many interesting young cutting-edge researchers from all across the world and to learn about the future directions that robotics research is headed to.

I was selected for the award based on my research, which is supervised and mentored by Professor Alfred M. Bruckstein, on multi-agent teamwork, and specifically on development of multi-agent trajectory planning algorithms for efficient robotic search missions and on development of algorithms for intelligent transportation systems aimed at enabling provably safe and efficient management and routing of large numbers of aerial vehicles for Urban Air Mobility applications.

I would like to recommend researchers that are interested in the algorithmic and modelling aspects of intelligent transportation systems to attend the top robotics conferences such as ICRA, RSS or IROS since many interesting and innovative research works related to these subjects are presented there.

I would like to thank again the Israeli Smart Transportation Research Center in supporting my participation in the RSS 2023 conference and allowing me to better understand the current state-of-the-art in my research field. I am confident that my participation at the conference will enable me to further advance research in the field and will assist my future academic career through the academic connections I made at the conference.

Sincerely,

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