



Program:

Sunday, June 30, 2019, at the Grand Water Research Institute (GWRI)

- 08:30 – 09:00 Registration and reception
- 09:00 – 09:05 *Opening remarks by Jack Haddad, Technion, Israel*
- 09:05 – 09:10 *Welcome by Tomer Toledo, head of TRI, Technion, Israel*
- 09:10 – 10:00 Keynote speaker:
*“Automated heavy-duty vehicle platooning and its influence on traffic”,
Karl H. Johansson, KTH Royal Institute of Technology, Sweden*
- 10:00 – 10:20 *“Feedback control of freeway traffic flow via time-gap manipulation of ACC-equipped vehicles: A PDE-based approach”, Nikolaos Bekiaris-Liberis and Argiris Delis, Technical University of Crete, Chania, Greece*
- 10:20 – 10:40 *“Cooperative vehicle merging with guaranteed collision avoidance”, Alexander Schwab and Jan Lunze, Ruhr-Universität Bochum, Germany*
- 10:40 – 11:00 *“Overview on Slovak-Israeli scientific research: Platoon modeling and control for mixed autonomous and conventional vehicles: a laboratory experimental analysis”, Mikulas Huba, Slovak University of Technology, Bratislava and Jack Haddad, Technion, Israel*
- 11:00 – 11:20 Coffee break
- 11:20 – 11:40 *“Travel behavior implications and modeling of connected and automated transport”, Yoram Shifan, Technion, Israel*

- 11:40 – 12:00 *“Driving behavior modeling and simulation of connected and automated vehicles”*, **Tomer Toledo**, Technion, Israel
- 12:00 – 12:20 *“Reflections on V2X communication application”*, **Zeev Shadmi**, Israel
- 12:20 – 13:30 Lunch break
- 13:30 – 14:20 Keynote speaker:
“Progression methods in traffic signal control”, **Nathan Gartner**,
University of Massachusetts Lowell, USA, and Ariel University, Israel
- 14:20 – 14:40 *“Resilient multivariable control of urban road networks under cyberattacks”*, **Pedro Mercader** and Jack Haddad, Technion, Israel
- 14:40 – 15:00 *“Nonlinear model predictive control to reduce network-wide traffic emission”*, **Deepak Ingole**, Guilhem Mariotte, and Ludovic Leclercq,
University of Lyon, IFSTTAR, France.
- 15:00 – 15:20 *“Optimal control strategy for relief supply considering information and demand uncertainty after a major disaster”*, **Riki Kawase**, Junji Urata,
and Takamasa Iryo, Kobe University, Japan
- 15:20 – 15:30 *Closing remarks* by **Jack Haddad**.

KEYNOTE SPEAKERS

Automated heavy-duty vehicle platooning and its influence on traffic

Prof. Karl H. Johansson, KTH Royal Institute of Technology, Sweden

Abstract: Automated and connected road vehicles enable large-scale control and optimisation of the transport system with the potential to radically improve energy efficiency, decrease the environmental footprint, and enhance safety. In this talk we will focus on automated heavy-duty vehicle platooning, which is currently being implemented and evaluated by several truck manufacturers world-wide. We will discuss how to deploy feedback control of individual platoons utilising the cellular communication infrastructure and how such controlled platoons can be used improve overall traffic conditions. It will be argued that the average total variation of traffic density can be reduced and thereby creating incentives for platooning beyond fuel savings and driver support. Extensive experiments done on European highways will illustrate system performance and safety requirements. The presentation will be based on joint work with collaborators at KTH and at the truck manufacturers Scania and Volvo.

Karl H. Johansson is Professor at the School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology. He received MSc and PhD degrees from Lund University. He has held visiting positions at UC Berkeley, Caltech, NTU, HKUST Institute of Advanced Studies, and NTNU. His research interests are in networked control systems, cyber-physical systems, and applications in transportation, energy, and automation networks. He has served on the IEEE Control Systems Society Board of Governors, the IFAC Executive Board, and the European Control Association Council. He has received several best paper awards and other distinctions from IEEE and ACM. He has been awarded Distinguished Professor with the Swedish Research Council and Wallenberg Scholar with the Knut and Alice Wallenberg Foundation. He has received the Future Research Leader Award from the Swedish Foundation for Strategic Research and the triennial Young Author Prize from IFAC. He is Fellow of the IEEE and the Royal Swedish Academy of Engineering Sciences, and he is IEEE Distinguished Lecturer.



Progression Methods in Traffic Control

Prof. Nathan H. Gartner, University of Massachusetts Lowell (USA) and Ariel University (Israel)

Abstract: Progression methods are some of the earliest methods that were developed for the coordination of traffic signals. Initially using time-space diagrams for arterial control, the techniques were later formulated as sophisticated optimization models. With the tremendous strides in optimization and computation capabilities, there has been an explosion in the application of progression methods in a variety of areas, including: network models, public transport, route control and connected and automated vehicles. This talk provides a review of recent research in this area and assesses the state of the art.

Dr. Gartner is Professor Emeritus at University of Massachusetts Lowell (USA) and Professor of Transportation Engineering at Ariel University in Israel. He obtained his D.Sc. degree from the Technion-Israel Institute of Technology and was previously on the faculties of the Technion and the Massachusetts Institute of Technology (MIT). He was also Visiting Professor at leading universities in Europe, China and Japan.



Dr. Gartner's research focuses on traffic control systems and strategies, and on transportation network analysis. He is the former Chairman of the Transportation Science Section of ORSA (now INFORMS) as well as the Traffic Flow Theory and Characteristics Committee of TRB, a division of the U.S. National Academy of Sciences. Dr. Gartner received numerous honors and awards, including the Robert Herman Lifetime Achievement Award by INFORMS and the IEEE Intelligent Transportation Systems Society Outstanding Research Award.

Monday, July 1, 2019, at Borowitz Building, Meeting Room No.100

Visit to Technion Sustainable Mobility and Robust Transportation (T-SMART) Laboratory

- 09:00 – 09:30 *Opening remarks and T-SMART research overview by **Jack Haddad**, head of T-SMART*
- 09:30 – 10:00 *“Automatic incident detection based on Bluetooth traffic monitoring”, **Pedro Mercader***
- 10:00 – 10:30 *“Max-Pressure Traffic Controller Based on Travel Times: An Experimental Analysis”, **Pedro Mercader***
- 10:30 – 10:45 Coffee break
- 10:45 – 11:15 *“Advanced Public Transportation Systems Based on Pre-signal Management”, **Miran Khwais***
- 11:15 – 11:45 *“Optimal Traffic Flow Merging on Freeways”, **Yazan Safadi***
- 11:45 – 12:15 *“Robust Interpolating Traffic Signal Control for Uncertain Road Networks”, **Shimon Komarovsky***
- 12:15 – 13:30 Lunch break
- 13:30 – 14:00 T-SMART laboratory autonomous platooning equipment, **Orit Ariav**
- 14:00 – 14:30 T-SMART Bluetooth monitoring system, **Jack Haddad**
- 14:30 – 19:00 Social Event: Nazareth Old City Tour
- 19:00 – 22:00 Dinner at Nazareth



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wcts2019@technion.ac.il