

## ISTRC Annual Call for Research 2020-2021

### The Israeli Smart Transportation Research Center

**Call publication: 15.10. 2020**

**Registration note: 7.12.2020**

**Final submission: 27.12.2020**

### Background

The Israeli Smart Transportation Research Center (ISTRC) at the Technion, in collaboration with Bar-Ilan University, was established jointly by the Smart Mobility initiative in Israel's Prime Minister's Office, and the Council for Higher Education. The aim is to encourage research and development, entrepreneurship, and industry in the field of smart mobility in Israel.

The center started its activity in 2020 and this is its first annual call for research, followed by a previous call dedicated to transportation and COVID19. You can learn more about the center from ISTRC website: <https://istrc.net.technion.ac.il/>.

### ISTRC Vision

**The vision** of the Israeli Smart Transportation Research Center is to unite the academic and R&D community and various stakeholders to initiate and leverage Interdisciplinary and Intersectoral research activities that would contribute to smart, efficient, and green transportation, and position Israel as a world leader in the field.

For this purpose, we define the **Vision of Zero Transportation Externalities** in three dimensions: Zero casualties, Zero delays, and Zero environmental harm.

- **Zero casualties:** Generating a safe, resilient and forgiving system that will optimally respond to safety and security failures while considering all road users (mixed traffic, vehicles, non-motorized and new modes, both automatic and manual), with zero fatalities and serious injuries, and a development and implication of cutting edge technologies and other means in the field of automation and connectivity.
- **Zero delays:** Generating an efficient and equitable transportation system to ensure optimal level of service that is tailored to individuals' mobility needs, while maintaining the needs of all. A system based on Transit Oriented Development, environmental friendly land use planning, and Mobility as a Service, that optimally

reflects the inherent opportunities of motorized and non-motorized transport modes, public and shared transportation, and in various levels of automation.

- **Zero environmental harm:** Preventing all types of emissions, noise, and other environmental externalities by developing and adopting clean and renewable energies for energy conservation and the promotion of sustainable transport modes and behavior.

Smart transportation research is interdisciplinary in nature, and hence requires collaboration between researchers from different fields and academic departments and institutions, together with a constant dialogue among industry, academy, and decision makers.

The center collaborates with all academic institutes and researchers in Israel to promote cutting edge research and insights as well as empower and develop human capital in the field.

**A knowledge gap research that was conducted by each of the nine Professional Committees of the center, covering the major fields of the smart transportation domain, led to a list of recommended topics for research which appears in Appendix A.** Each committee is chaired by a senior researcher from an Israeli academy institute, and includes members from academy, industry, and the public sector.

### **Objectives of this Call:**

Joining forces to bring new insights towards the achievement of the “**Zero Transportation Externalities**” vision by:

- Promoting multidisciplinary research, in which diverse areas of expertise or perspectives provide an added value
- Promoting collaborative research, inter-sectorial (academy, industry, public sector, NGO) and/or inter institutional research
- Promoting both theoretical and basic research, applied research and practical implementation

### **Research Topics**

While we welcome any topic that contributes to the Vision of Zero Transportation Externalities, the list of themes in Appendix A represents the topics that were recommended by the professional committees of the center.

### **Funding scope and duration**

The ISTRC will allocate up to 3,500,000 NIS through this call, in three tracks:

1. **Small research track:** Research grant could be up to 100,000 NIS for the duration of up to 12 months.

2. **Medium research track:** Research grant could be up to 300,000 NIS for the duration of up to 24 months.
3. **Large research track:** Research grant could be up to 500,000 NIS for the duration of up to 36 months.

## Eligibility criteria

- The principal investigator (PI) must be a faculty member in an academic institute in Israel, including all universities and colleges.
- A principal investigator can have only one ISTRC research grant at a time. ISTRC will publish a Call for Research each year. Principal investigators would be eligible to submit proposals for ISTRC Annual Call only if their research grant period ends in less than six months.
- Large research must include **collaboration / cooperation with at least one of industry / public sectors / NGOs or another academic institute**. For Medium research, it is highly recommended, for small research it is a bonus.

## How to apply?

**Registration note was originally November 22 and postponed to December 7 2020.**

All applicants must submit a **registration note on December 7, 2020**.

It must include: topic, name of principal investigator and other researchers and partners, their titles, e-mail addresses, academic institute, department / research center, keywords and the relevant research track (Large, Medium, Small research).

[Registration note form here.](#)

**Full submission by December 27, 2020**

### Specifications for submission:

- File type - Full application will be sent in **one PDF file**.
- Language - Research proposals should be written in English.
- Content - Full application should include:
  1. **1<sup>st</sup> page:** Research title; Name of principal investigator, Institute name; Names of other researchers and organizations; Keywords; Short abstract (up to 200 words). Recommended but not required: topic or topics number from Appendix A that the proposal is addressing.

2. **Research Proposal:** including background, goals, methodology, research plan, cooperation with industrial company / public sector (must be included in Large research and recommended for Medium research), Impact of research.

This part of the proposal has a page limit. In Small research proposals it should be up to 5 pages, In Medium and Large research proposals it should be up to 10 pages. The proposal will be submitted in font Times New Roman 12, line spacing 1.5. The page limit does not include references, these can appear in additional pages as needed.

3. **Short CV of all researchers** (up to 3 pages for each researcher in same format as of the Research Proposal).

4. **Budget plan:**

- Up to 100,000 NIS for Small research / Up to 300,000 NIS for Medium research / Up to 500,000 NIS for Large research.
- The grant will fund direct costs including computer hardware and software, primary data collection, research assistants and other expenditures as customary and subject to the ISTRC discretion. The grant funding may not be used for salary of faculty members, neither for researchers in a foreign institute.
- Budget plan will include institutional overhead and VAT if needed, included in the maximum amount mentioned above.

5. **A statement regarding any other submitted/winning proposal on similar topics**, in such cases specify the differences between the submitted proposal and status of the other proposal (already winning/just submitted/other).

6. **Approval and signature of the research authority of the principal investigator.** The proposal can be sent by either the principal investigator or by the research authority of the principal investigator institute.

- Submission - by e-mail to [istrc@technion.ac.il](mailto:istrc@technion.ac.il). In the email subject please mention: ***ISTRC Call for research 2020-21 \_ Last name of the principal investigator.***
- Due Date - The application must be sent by December 27, 2020 after it was approved and signed by the Research Authority of the principal investigator's institute.

**Applications must include all the above items. Incomplete applications or applications received after the deadline will not be reviewed.**

Following the submission of an application, further details and clarifications about the research may be required from the principal investigator to assist with the evaluation of the application.

## Assessment of proposals

Eligible proposals will be reviewed by a review committee established by ISTRC with at least five faculty members from at least five different institutes in Israel. Each proposal will be assessed by (at least) three experts.

### Assessment criteria:

1. **Relevance** to smart transportation and the potential to promote the center's vision of "Zero Transportation Externalities" - Threshold criteria.
2. **Innovation** - Extent that the proposed work is beyond the state of the art, and / or demonstrates meaningful innovation potential.
3. **Overall quality** - Clarity and pertinence of the objectives, soundness of the concept, and credibility of the proposed methodology.
4. **Joint Research** - An interdisciplinary or/and inter-institutional or/and inter-sectoral approach (collaboration with industry/public sector/NGO), providing added value to the smart transportation domain. Advantage to more types of collaboration.
5. **Potential impact level** - on smart transportation domain, both academic and practical, including technology transfer. Potential for further funding from other sources (Horizon, etc).
6. **Feasibility** of the proposal implementation plan, availability of infrastructure and data to meet research deliverables within the defined period of time and budget aligned with the research plan (resources / timetable / deliverables).
7. **Qualifications** and experience of the research team.

## Application Information

The information you share in the process of the application will only be used by ISTRC reviewers for the purpose of evaluation of your application.

The title of the proposed research and names of the researchers selected may be published by ISTRC.

To the extent that research proposals include unique knowledge, the applicant undertakes to protect the rights arising from it in a timely manner. ISTRC will not be responsible for this.

ISTRC is working under the terms and conditions of the Council for Higher Education Call.

ISTRC is not and shall not be liable to the content of any research proposal, to the performance of any research that has received funding from the ISTRC and for any implementation or use of the results generated in such research, either by the applicant or by any third party.



## Reporting

- A scientific report, 10-30 pages long should be sent to ISTRC once a year during the time span of the sponsored research.
- The grant will be allocated to the academic institute after receiving an expenditures budget report, signed by the finance manager of the academic institute.
- ISTRC will publish researchers' names and topics of the winning researches as well as the final scientific report on ISTRC website and publications.
- All publications generated from the research will include acknowledgment of ISTRC funding ([see here](#)).
- Selected researches' reports will be presented by the researchers at the center's workshops or conferences, if requested.

## Appendix A

### Topics for ISTRC Annual Call for Research 2020-2021

1. Travel behavior in the era of automated, connected, and shared mobility:
  - a. Likelihood and patterns of behavior shifts
  - b. Promoting the shared use of private vehicles
  - c. Attitudes (and other determinants of behaviors) of specific groups – elderly, people with disabilities, etc.) towards the purchase and the use of various new modes.
2. The use and potential of behavioral economics from the perspective of smart mobility choices:
  - a. Mapping the cognitive biases that could factor in adopting shared mobility and new modes.
  - b. Using insights from behavioral economics to the design of incentives and persuasive techniques to shift travelers from private car usage to MaaS.
3. Travel Patterns of Generation Y and Generation Z regarding ownership and use of micro-mobility modes, connected and automated vehicles, Mobility as a Service, and shared travel.
4. Activity travel behavior - achieving improved interpretability and addressing the spatiotemporal transferability of machine learning-based models.
5. Developing innovative ways to access new data sources and methods to easily process data from multiple sources and provide user-friendly output using big data and machine learning methods and tools.
6. Machine learning-based methodologies for gaining new insight regarding equity in transit and the impact of transit on public health ML models.
7. Business models to enable the implementation of smart transportation and assimilation of autonomous vehicles providing value for users alongside economic viability for vehicle manufacturers and service providers.



8. Good implementation and optimal utilization of policies involve educating the ecosystem in which the policy operates, mapping areas and methods for educational activity.
9. The contribution of micro-mobility to the vision of zero externalities, considering user behavior, road accidents, traffic congestion relief, etc.
10. Smart transportation applications for enhancing the safety of vulnerable road users, pedestrians, cyclists, motorcyclists and micro-mobility users.
11. The contribution of a MaaS and multi-modal integrated provision to the vision of zero delays considering traditional and innovative modes in providing a smooth and easy multi-model connection for all activities taking into consideration modes, parking, information, etc.
12. Advancing the penetration and usage of electric vehicles including new technologies and charging systems, regulation, and behavior.
13. Measures and tools for decreasing logistics' urban movements and last mile solutions. Various distribution modes (conventional, non-powered, autonomous, drones), infrastructures (storage, parking, dedicated lanes), policy, public transport and MaaS integration.
14. Maintenance and repair tools of old cars in the future – diagnostic tool that will update and help shops with the care of old cars, which regular service will be discontinued.
15. Advanced technology solutions to driving performance monitoring including, fatigue and distraction.
16. Safety impact assessment of smart transportation developments.
17. Using big data and machine learning based on intelligent transport to entangle the cyber security and privacy challenges.
18. Human-smart vehicle interactions including cooperation and collaboration between the autonomous system and the human drivers, operators, and pedestrians in order to improve the efficiency and safety of travel, as well as the trust and satisfaction of people with the automated environment.



19. Extending the use of infrastructure (I2V) and onboard (V2V) sensors for understanding the trajectories of uncontrolled road users (e.g. pedestrians, manual vehicles, animals ) for safety improvement of autonomous vehicles.
20. Collaborative algorithms for motion planning of autonomous vehicles - using swarm technologies for large groups of autonomous vehicles for improving traffic flow, safety, robustness, energy consumption, etc.
21. Methodology for assessing AI for autonomous vehicles.
22. Learning algorithms and models for intelligent traffic management.
23. Smart Vehicles, roads and ride designs for optimal cooperative transport.
24. Resilient urban traffic control: advance control strategies (traffic signal, routing, pricing, lane allocation) for large-scale urban traffic networks under uncertainties, failures, cyber attacks.
25. Urban air mobility: real-time operation and control of urban air mobility, including traffic air flow management, manned and unmanned aircraft coordination.
26. Railway traffic management: enhanced modelling and control of railway (trains, light urban rails, etc.) operations in stations and networks.
27. Innovative solutions promoting sustainable transport modes and behavior, design to reduce global warming and prevent /cope with climate crisis.
28. Any topic contributing to achieving the Vision of Zero Transportation Externalities.