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Science and innovation
for safer roads everywhere and for all

National Technical University of Athens
Road Safety Observatory

Online workshop in the framework of
6TH UN GLOBAL ROAD SAFETY WEEK
17 - 23 May 2021
Streets for Life
#Love30
DECADE OF ACTION FOR ROAD SAFETY 2021 - 2030
30 KM/H
Thursday 20 May 2021
Innovation in Road Safety Research

The NTUA Road Safety Observatory

George Yannis
Professor

Together with:
all the great nrso team

Presentation outline

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4. Road Safety Research Areas (7)
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NTUA Road Safety Observatory
A Center of Research and Innovation Excellence

NTUA Road Safety Observatory

- A Center of Research and Innovation Excellence on Road Safety, with global recognition [ranked: 2nd in Europe and 6th worldwide (AAP 2018)]
- within the Department of Transportation Planning and Engineering [ranked: 9th in Europe and 39th worldwide (ShanghaiRanking's 2017), scientific citations: 3rd in Europe and 19th worldwide (Pulse 2017)]
- of the School of Civil Engineering [ranked: 3rd in Europe and 7th worldwide (ShanghaiRanking's 2020)]
- of the National Technical University of Athens [the oldest (since 1837) and most prestigious educational technical institution of Greece]

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NRSO - Mission

The Mission of the NTUA Road Safety Observatory (www.nrso.ntua.gr) is:

- to support the Greek and the International Road Safety Community with current key road safety knowledge and data
- gathered, analysed and organised within the research activities of the Department of Transportation Planning and Engineering of the School of Civil Engineering of the National Technical University of Athens
- as well as within co-operations with various national and international road safety organisations

NRSO - Vision

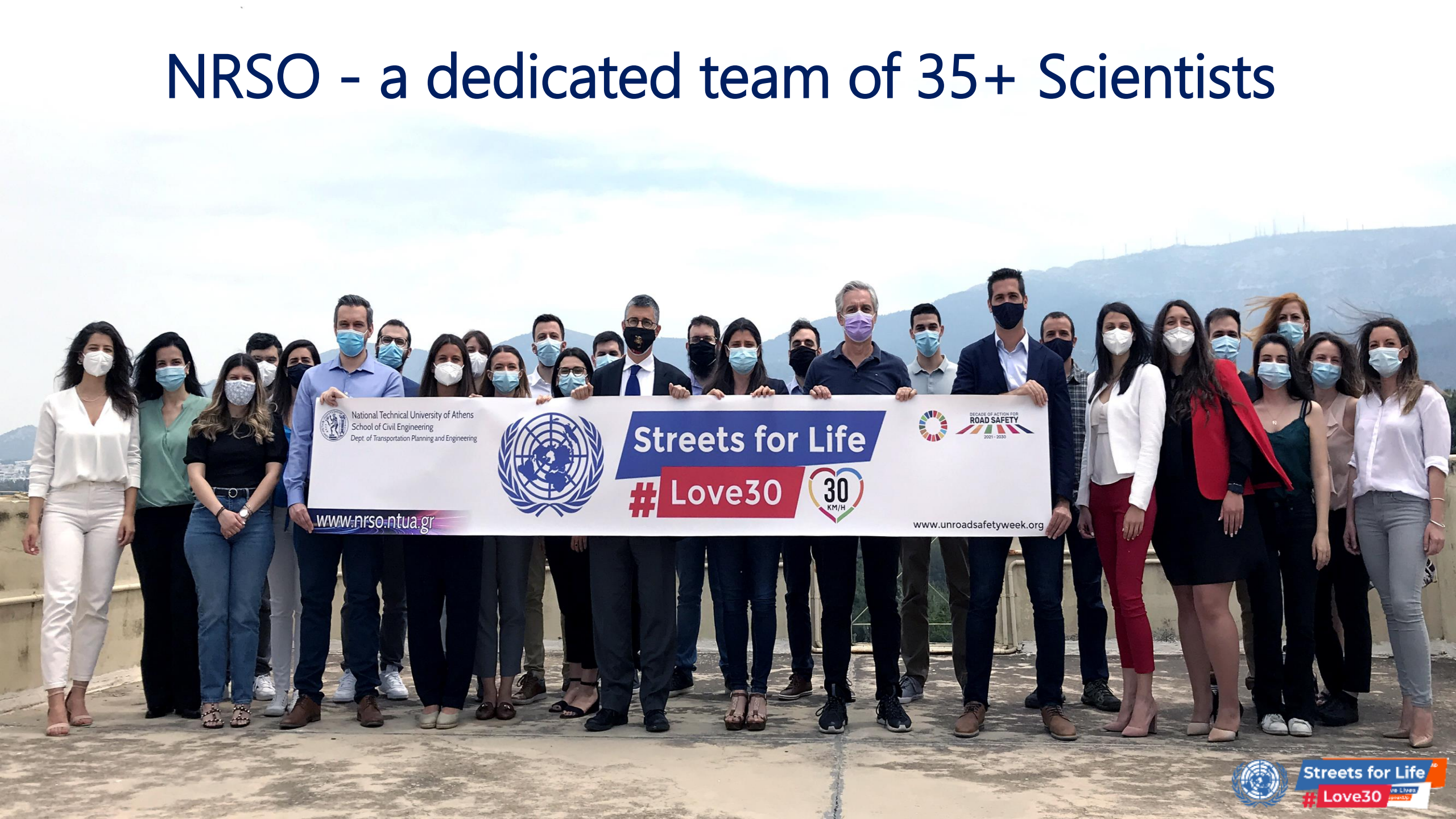
Science and innovation for safer roads everywhere and for all

The Vision of the NTUA Road Safety Observatory is:

- to contribute to the significant reduction of the number of road crashes and of the related casualties in Greece, in Europe and worldwide

- through the scientific support of evidence based decision making for the necessary road safety policies, programmes and measures

NRSO - a dedicated team of 35+ Scientists



NRSO - Dedicated team

- Internationally recognized Professors
- 10 Senior Transportation Engineers (6 PostDoc)
- 9 Transportation Engineers - PhD Candidates
- 6 Transportation Engineers - Research Assistants
- 2 Information Systems Engineers
- 3 Administrative Assistants

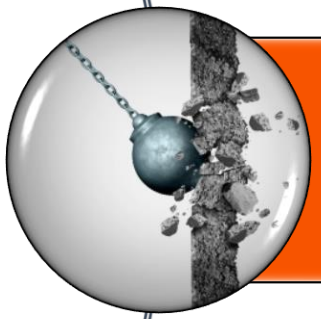
with high level scientific expertise in:

- **traffic safety**, mobility, transport and traffic planning and engineering
- **data science** and advanced statistical data analysis
- intelligent transportation systems and **automation**

NRSO - Fundamental Research Principles

Excellence

Advanced and innovative technology concepts



Impact

Research with significant impact to society and economy

Implementation

State-of-the-art organisation and management structures

NRSO - The Value of the Researcher

We are committed to the Value of the Researcher, which:

- starts with carrying out excellent research,
- is tested by publishing in high-level peer review journals and
- makes the difference when awarded project grants through highly competitive procedures

NRSO - Research Performance

- More than 120 road safety research projects since early '90s:
  - 55 Greek
  - 65 International

- 86 of these research projects were assigned through highly competitive (national or international) procedures:
  - Horizon 2020 - 11 projects out of 46 proposals submitted

iDREAMS

levitate

SHOW AUTOMATED URBAN MOBILITY

HADRIAN

DRIVE2 THE FUTURE

BE OPEN

ESRA E-Survey of Road users' Attitudes

Baseline

e-MOPOLI Interreg Europe

BESMART

NRSO - Research Publications

- More than 650 road safety publications:
  - in scientific journals (more than 200)
  - in scientific conference proceedings (more than 400)
  - with more than 6.000 citations
  - i10-index: google scholar: 131
  - h-index: google scholar: 37, scopus: 27

- More than 500 presentations in scientific conferences:
  - more than 350 international and more than 150 national
  - after invitation in more than 220 of them

Most of them available on-line at:
http://www.nrso.ntua.gr/geyannis/

NRSO - Road Safety PhDs

- Apostolos Ziakopoulos, 2020
  "Spatial analysis of road safety and traffic behaviour using high resolution multi-parametric data"
- Dimitris Tselentis, 2018
  "Benchmarking Driving Efficiency using Data Science Techniques applied on Large-Scale Smartphone Data"
- Dimosthenis Pavlou, 2016
  "Traffic and safety behaviour of drivers with neurological diseases affecting cognitive functions"
- Akis Theofilatos, 2015
  "An advanced multi-faceted statistical analysis of accident probability and severity exploiting high resolution traffic and weather data"
- Panagiotis Papantoniou, 2015
  "Risk factors, driver behaviour and accident probability - The case of distracted driving"
- Eleonora Papadimitriou, 2010
  "Pedestrian behaviour and safety models in urban road networks"

NRSO - PhDs under preparation

- Virginia Petraki, 2020
  "Big Data and New Urban Sustainable Mobility Forms"
- Eva Michelaraki, 2020
  "Road accident risk factors and big data"
- Dimitris Nikolaou, 2019
  "Big data in road safety decision support"
- Armira Kontaxi, 2019
  "Integrated support of driver traffic behaviour and safety by smartphone data"
- Julia Roussou, 2019
  "Impact assessment of connected and automated transport systems"
- Alexandra Laiou, 2019
  "Measuring road safety culture"
- Eleni Chalkia, 2017
  "Impact of route and transport mode choice on road safety"
- Foteini Orfanou, 2016
  "Modelling automated traffic using high resolution data"
- Katerina Folla, 2015
  "Advanced macroscopic models for the analysis of international road safety data

NRSO - PhD & PostDoc Alumni Careers

Our PhD and PostDoc Alumni Engineers are pursuing excellent academic, engineering and consulting careers worldwide:

- Technical University of Munich (TUM)
- Technical University of Delft (TUD)
- Ecole Nationale des Ponts et Chaussées (ENPC)
- Ecole Polytechnique Fédérale de Lausanne (EPFL)
- Loughborough University (UL)
- National Technical University of Athens (NTUA)
- University of Patras (UPatras)
- University of West Attica (UniWA)
- Ernst & Young (EY)

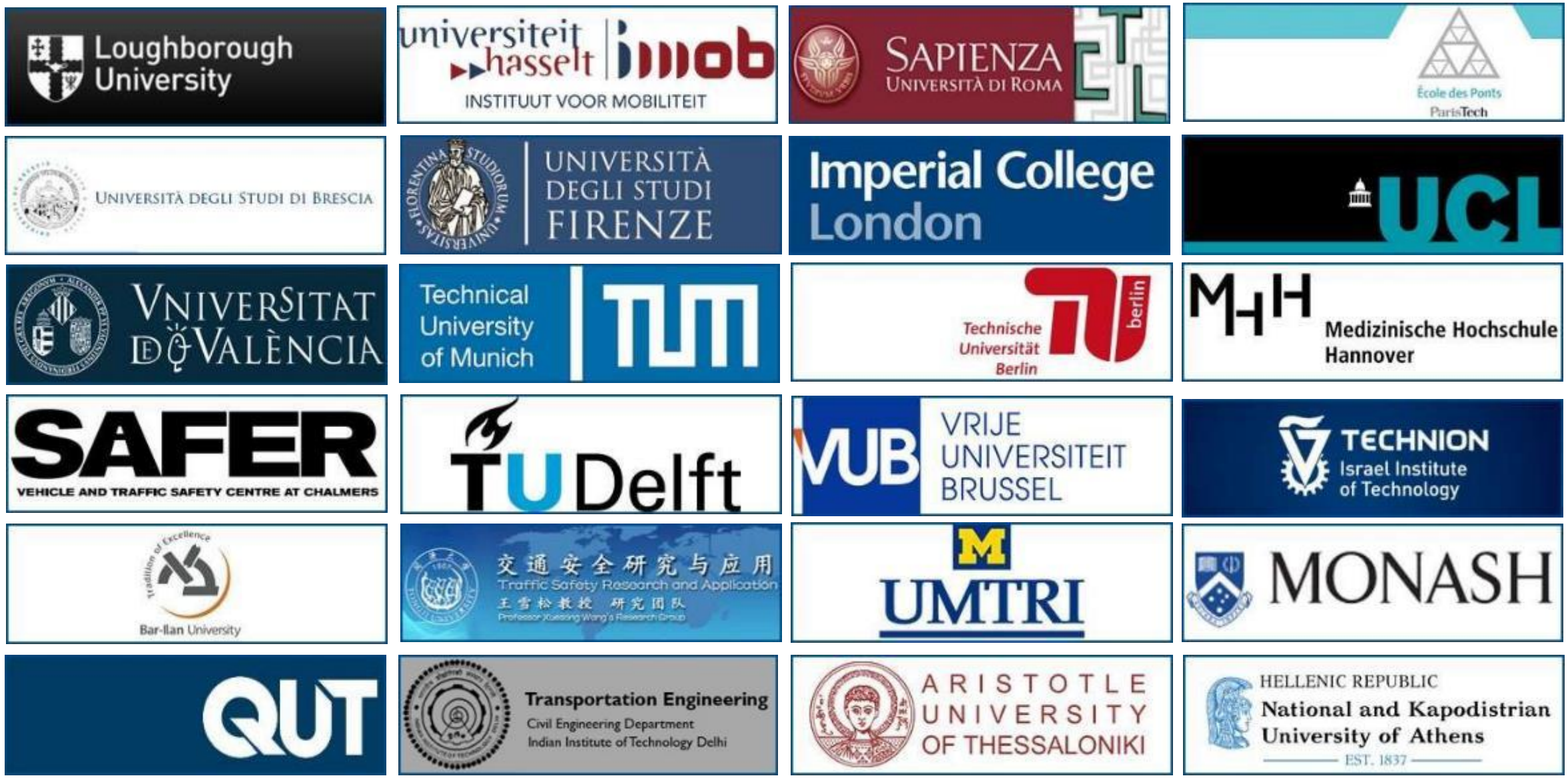
Cooperations and Partners

Our Cooperations - Greece

Our Cooperations - Europe

Our Cooperations - Worldwide

Partners - Universities



Partners - Research Institutes

NRSO Website and Systems

The NRSO website (1/2)

An international reference website
- information system since 2004, with
state-of-the art road safety data and knowledge

www.nrso.ntua.gr

- more than 3.000 visits per month
- 113 electronic newsletters since 2007
- tens of social media posts and tweets annually (with 5K - 50K views each)
- network of more than 4.000 road safety experts in Greece (1.000+) and worldwide (3.000+)

The NRSO website (2/2)

A dynamic website with a wealth of information:

www.nrso.ntua.gr

- since 2004 with more than 1.800 items
- all important road safety News in Greece, in Europe and globally
- new Reports covering all modern road safety issues
- latest available road safety Data for Greece, the EU and the world
- exhaustive list of road safety Conferences in Greece and globally
- links to dozens road safety Resources globally

NRSO Data and Knowledge Systems

Databases

- SANTRA - Greek Road Accident Database with disaggregated data (1985 - 2019, 1,2 million recordings)
- CARE - European Road Accident Database with disaggregated data (1991 - 2020, 40 million recordings)
- IRTAD - International Road Accident Database with aggregated data
- Databases of International Organisations (WHO, IRF, ERF, UITP)
- Databases with Aggregated Data (Vehicle fleet, veh-km, driver behavior, etc.)

Knowledge Systems

- Online Road Safety Library > 6.000 key Reports
- International Bibliography database (scopus, science direct)
- Analysis tools (traffic, simulation, statistics)

George Yannis, The NTUA Road Safety Observatory - NRSO

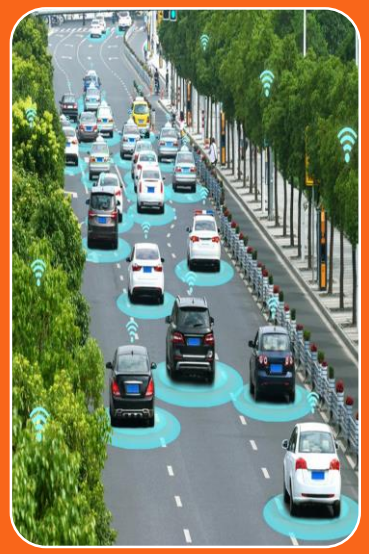
NRSO Research Infrastructure

- Driving Simulator (Foerst ¼ cab, moving base) for driver behavior experiments
- Unmanned Aerial Vehicles (Drones) for traffic monitoring
- Smartphone Telematics application (powered by OSeven) for driver behaviour monitoring
- On-Board Diagnostics Devices (OBD) for driver behavior monitoring
- Cameras and other devices for traffic counts, speed monitoring, position monitoring (GPS)

Road Safety Research Areas

The Road Safety Research Areas

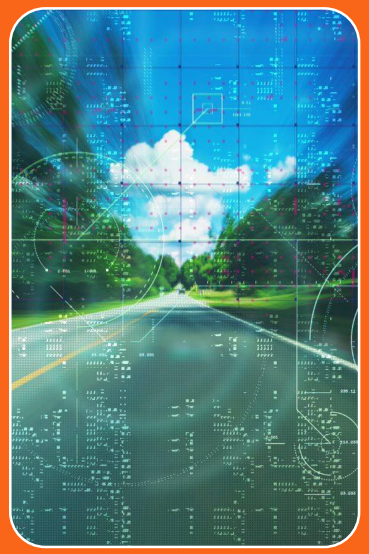
Road Safety Policy and Data



Traffic Automation and Safety

Driver Behaviour Telematics

Driver Safety Behaviour



Road Infrastructure Safety

Mobility and Safety

Road Safety Policy and Data

- Nrss2030 - Development of the Road Safety Strategic Plan in Greece 2021-2030
- Baseline-G - Collection of Road Safety KPIs in Greece
- Baseline-I - EU Methodology for Road Safety KPI Collection
- BeOpen - Open science in road safety

Optimize policy decisions and road user choices based on advanced analyses of reliable crash, exposure and KPI data

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Traffic Automation and Safety

- Drive2theFuture - Driver needs and behaviour in automated traffic
- Levitate - Societal impacts of connected and automated vehicles
- Show - Shared Automation Operating Models for Worldwide Adoption
- Hadrian - Holistic Approach for Driver Role Integration into Automation

Automation can boost safety
but safety issues during transition phases
require targeted multi-disciplinary research

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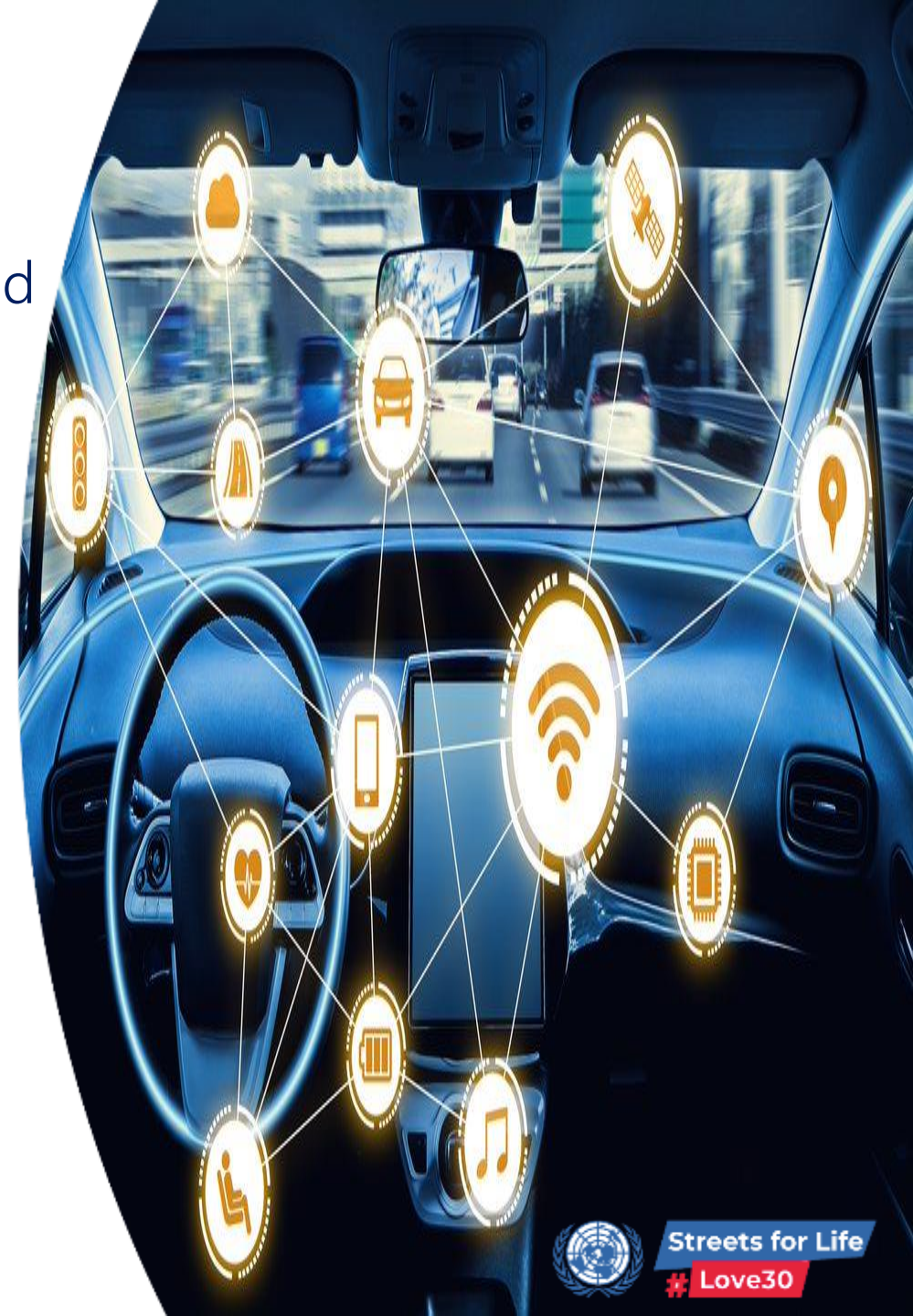
Driver Behaviour Telematics

- i-Dreams - Driver-vehicle-environment interactions and safety tolerance zone
- SmartMaps - Smart city mapping for safer and eco driver behaviour
- BeSmart - Smartphone applications for driver safety behaviour support

Telematics is an excellent
easy-to-implement and massive solution
for immediate upgrade of driver safety behaviour



Driver Safety Behaviour

- Esra2 - Monitoring road safety attitudes globally
- Distrapp - Investigation of driver distraction effect using big data from smartphones
- OldNat - Safety behaviour assessment of older drivers in real driving conditions
- Covid-19 impact on mobility and safety

Only a thorough understanding of road user behaviour and perceived risk can lead to targeted safety measures

Road Infrastructure Safety

- NetSafety - A Methodology for Network-wide Road Assessment
- i-SafeModels - Modelling crash modification factors globally
- ElAudit - Road Safety Audit of the Hellinikon Metropolitan Pole

Under the safe system approach
a road environment without surprises and forgiving
can prevent and accommodate road user errors

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Mobility and Safety

- AGW - Model traffic and parking arrangements for the Athens Great Walk
- e-Mopoli - Electromobility as driver for sustainable mobility and safety
- EcoCharge - Socio-economic impact of environmental transport charging

Integration of safety needs
into sustainable urban mobility plans
is the key for high acceptance
and great safety benefits

Road Safety Research Perspectives

Key Road Safety Considerations

- Speed is highly misunderstood by all
- Vulnerable road users are not accommodated
- We spend too much without effectiveness monitoring
- Unrealistic expectations of technology (especially of automated vehicles)
- Too much data, too little usage
- Need for more road safety science and budgets

Road Safety Policy Perspectives

- Focus on the key road accident risk factors:
  - **Speed, Speed and Speed**
  - Drink and Drive
  - Distracted Driving
  - Not use of seat belt and helmet
- Adapt urban mobility management to accommodate and balance current and future mobility and safety needs of the vulnerable road users (pedestrians, cyclists, motorcyclists): **Reduce Speed everywhere**
- Develop strong road safety culture of the Authorities and all Stakeholders (safe system approach) and the whole population

Road Safety Technology Perspectives (1/2)

- **Technology** can be the catalyst for road safety, through:
  - Public private partnerships
  - Clear problem analyses (well defined objectives)
  - Systematic effectiveness monitoring

- **Great** need for:
  - more data and knowledge
  - better exploitation of current and future data
  - broader geographical coverage

- **Data** focus on:
  - more accurate road accident data (LMIC Counties)
  - exposure data and performance indicators
  - measures and policies effectiveness evaluation

Road Safety Technology Perspectives (2/2)

- Digitalization and Artificial Intelligence open great new data possibilities for:
  - road user support and guidance
  - evidence based public and private road safety decision making at all levels

- New great potential for seamless data driven performance from safety problems identification to selection and implementation of optimal solutions

- Exploitation of the high safety potential of vehicle and traffic automation, with focused research on the transition phase and the vulnerable road users

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