



www.nrso.ntua.gr

National Technical University of Athens
Road Safety Observatory

Friday
19 May
2023
13:00-17:00

Workshop
in the framework of
7th UN Global Road Safety Week

StreetsforLife
#RethinkMobility

WE DEMAND
SAFE AND SUSTAINABLE
MOBILITY

Road Safety Research Challenges

DECADE OF ACTION FOR
ROAD SAFETY
2021 - 2030

unroadsafetyweek.org

NTUA Road Safety Observatory

George Yannis
Professor

Together with:
all the great nrso team

*Science and innovation
for safer roads everywhere and for all*

Presentation outline

1. The NTUA Road Safety **Observatory** (12)
2. Cooperations and **Partners** (5)
3. NRSO Systems and **Advocacy** (6)
4. Road Safety **Research Areas** (7)
5. Road Safety Research **Perspectives** (4)



NTUA Road Safety Observatory

A Center of Research and Innovation Excellence



NTUA Road Safety Observatory

since 2004

- 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: 18th in Europe and 50th worldwide ([QS World University Rankings](#), 2022), scientific citations: 4th in Europe and 26th worldwide among all Transportation Departments, with the best performance among all NTUA and Greece Departments ([EduRank](#)'s)]
- of the **School of Civil Engineering** [ranked: 2nd in Europe and 4th worldwide ([ShanghaiRanking](#), 2021)]
- of the **National Technical University of Athens** [the oldest (since 1837) and most prestigious educational technical institution of Greece]



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)
- 10 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**



George Yannis, The NTUA Road Safety Observatory - NRSO

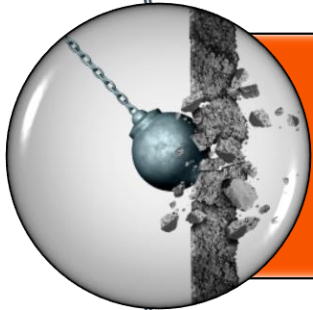


NRSO - Fundamental Research Principles



Excellence

Advanced and innovative technology concepts



Impact

Research with significant impact to society and economy



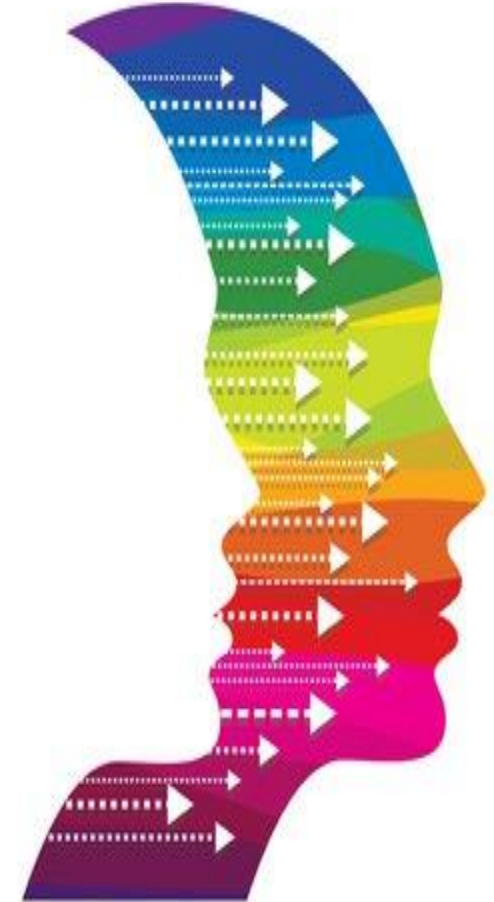
Implementation

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 **140** road safety research projects since early '90s:
 - 65 Greek
 - 75 International
- **96** of these research projects were assigned through highly competitive (national or international) procedures:
 - EU Horizon - **11 projects** out of 49 proposals submitted



NRSO - Research Publications

- More than **800 road safety publications**:
 - in scientific journals (more than 230)
 - in scientific conference proceedings (more than 500)
 - with more than 9.000 citations
 - i10-index: google scholar: 169
 - h-index: google scholar: 46, scopus: 34
- More than **600 presentations** in scientific conferences:
 - more than 420 international and more than 180 national
 - after invitation in more than 270 of them

All **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

- **Marios Sekadakis, 2021**
"Analysis of traffic safety and behaviour of autonomous vehicles during switching automation levels"
- **Maria Oikonomou, 2021**
"Automated vehicles impact on traffic and the environment"
- **Virginia Petraki, 2020**
"Big Data and New Urban Sustainable Mobility Forms"
- **Eva Michelaraki, 2020**
"Road crash 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 Systems and Advocacy



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**
- **123 electronic newsletters** since 2007
- **tens of social media posts** and tweets annually (with 10K - 75K views each)
- network of more than **5.500 road safety experts** in Greece (1.500+) and worldwide (4.000+)



George Yannis, The NTUA Road Safety Observatory - NRSO

The NRSO website (2/2)

A dynamic website with a wealth of information:

www.nrso.ntua.gr

- since 2004 with more than **2.100 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



George Yannis, The NTUA Road Safety Observatory - NRSO

The screenshot displays the NRSO website interface. At the top, the header includes the NTUA logo and navigation links: Home, About, Knowledge, Data, Conferences, News, and Links. The main content area is divided into several sections:

- Systems:** A vertical sidebar on the left containing logos for European Road Safety Observatory, European Road Safety Observatory, SafeFITS, pract-repository, and levitate.
- Cooperations:** A section below Systems, featuring logos for Europe, UNECE, ETSC, CEDR, FEHRL, ectri, ERF, and FEVR.
- Worldwide:** A section below Cooperations, featuring logos for International Transport Forum, World Health Organization, and World Bank.
- Road Safety Conferences:** A central section with a large image of a conference and a list of upcoming events for 2024 and 2023. The 2024 list includes DD12024, 30th ITS World Congress, 2023 Annual Polis Conference, ICSC2023, 35th ICTCT Conference, International Alcohol Interlock Symposium, EWGT 2023, EU-Safety 2023 Conference, XXVIII World Road Congress, 8th International HUMANIST Conference, ICTR2023, LWC International Conference, HEART2023, 16th World Conference on Transport Research, Vision Zero Conference, ETSC Pin Conference 2023, IPIC 2023, 34th ICTCT Conference, CITA International Conference, 21st European Transport Congress, ITF 2023 Summit, Pin talk, ITS European Congress, 7th UN Global Road Safety Week, HADRIAN Symposium, EUCAD 2023, I-DREAMS Final Event, MEDIATOR Final Event, 27th ESV, NHTSA, PACTS spring Conference 2023, and ITSC2023. The 2023 list includes 30th ITS World Congress, 2023 Annual Polis Conference, ICSC2023, 35th ICTCT Conference, International Alcohol Interlock Symposium, EWGT 2023, EU-Safety 2023 Conference, XXVIII World Road Congress, 8th International HUMANIST Conference, ICTR2023, LWC International Conference, HEART2023, 16th World Conference on Transport Research, Vision Zero Conference, ETSC Pin Conference 2023, IPIC 2023, 34th ICTCT Conference, CITA International Conference, 21st European Transport Congress, ITF 2023 Summit, Pin talk, ITS European Congress, 7th UN Global Road Safety Week, HADRIAN Symposium, EUCAD 2023, I-DREAMS Final Event, MEDIATOR Final Event, 27th ESV, NHTSA, PACTS spring Conference 2023, and ITSC2023.
- Upcoming Events:** A section on the right side of the main content area, featuring logos for TRA, POLIS, and a subscribe button.
- Archives:** A section at the bottom right, featuring logos for StreetsforLife, RethinkMobility, and Taq cloud.

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** > 6.500 key Reports
- International **Bibliography** database (scopus, science direct)
- Analysis **tools** (traffic, simulation, statistics)



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)





George runs 30 Marathons in 30 Months for 30km/h speed limit in all cities

Advocacy – 30km/h cities

- Scientific evidence from several cities so far, demonstrates more than **40% lives saved with the introduction of 30km/h zones**; in parallel to significant environmental, energy and health impacts with less fuel consumption and more walking and cycling
- The discussion and introduction of 30 km/h city zones faces strong reactions and rigid inertia, whereas supporters' voices are **weak and inefficient** resulting in hesitant politicians and Authorities.
- After more than 30 years of dedication to road safety science and several Marathon races, stepping beyond the continuous scientific pleas and **promoting more actively** the 30 km/h city through the challenge of 30 Marathons in 30 months.



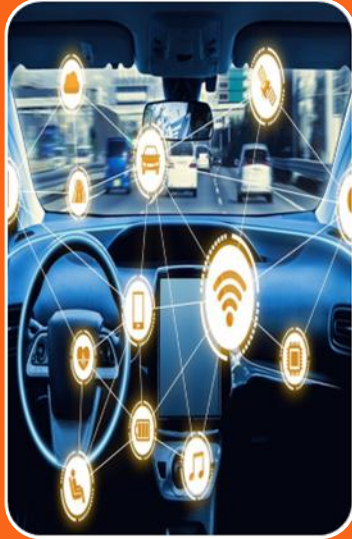
Road Safety Research Areas



The Road Safety Research Areas



Traffic
Automation
and
Safety



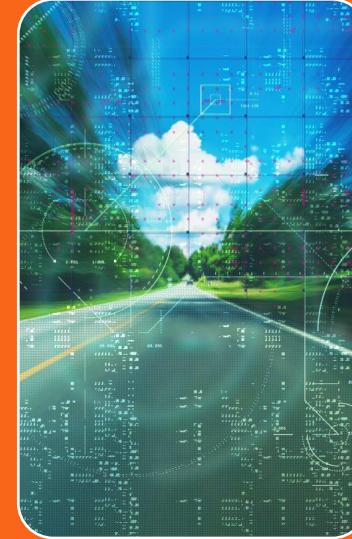
Driver
Behaviour
Telematics



Driver
Safety
Behaviour



Road
Safety
Data
Systems



Road
Infrastructure
Safety



Mobility
and
Safety



Traffic Automation and Safety

- Show - Shared Automation Operating Models for Worldwide Adoption
- Hadrian - Holistic Approach for Driver Role Integration into Automation
- Drive2theFuture - Driver needs and behaviour in automated traffic

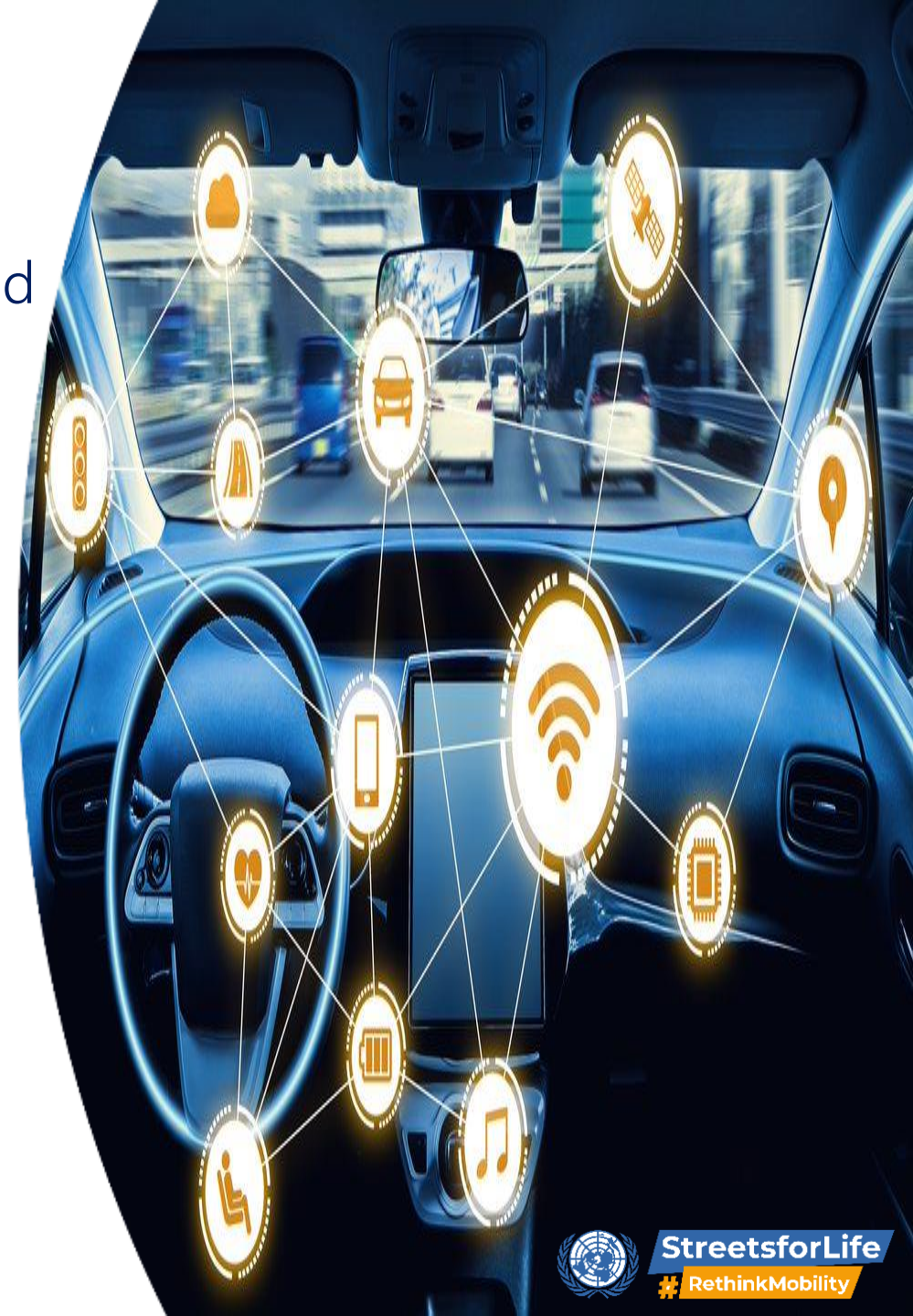
*Automation can boost safety
but safety issues during transition phases
require targeted multi-disciplinary research*



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

- Phoebe - Predictive Approaches for Safer Urban Environments
- Ivory - AI for Vision Zero in Road Safety
- ESRA3 - E-Survey of Road users' Attitudes

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



Road Safety Data Systems

- [Ersonext](#) - Support to the European Road Safety Observatory
- [Trendline](#) - Support of technical activities for the development and collection of Road Safety KPIs
- [Napcore](#) - National Access Point Coordination Organisation for Europe

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



Road Infrastructure Safety

- NetSafety - A Methodology for Network-wide Road Assessment
- i-SafeModels - Modelling road infrastructure safety
- Piarc - Global Road Safety Knowledge Exchange

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



Mobility and Safety

- [Mimob](#) - Micromobility Safety: Back to the Future
- [Peve](#) - Unsafe traffic events
- [30m30](#) - Promoting 30km/h speed limit in all Cities - 30 Marathons in 30 months

*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 crash 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 crash 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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