



[www.nrso.ntua.gr](http://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](http://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

- A **Center of Research and Innovation Excellence on Road Safety**, with global recognition [ranked: 2<sup>nd</sup> in Europe and 6<sup>th</sup> worldwide (AAP 2018)]
- within the **Department of Transportation Planning and Engineering** [ranked: 18<sup>th</sup> in Europe and 50<sup>th</sup> worldwide ([QS World University Rankings](#), 2022), scientific citations: 4<sup>th</sup> in Europe and 26<sup>th</sup> worldwide among all Transportation Departments, with the best performance among all NTUA and Greece Departments ([EduRank](#)'s)]
- of the **School of Civil Engineering** [ranked: 2<sup>nd</sup> in Europe and 4<sup>th</sup> 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.nrsso.ntua.gr](http://www.nrsso.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



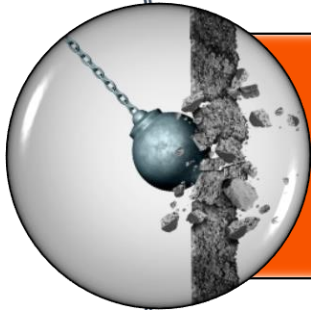


# NRSO - Fundamental Research Principles



## **Excellence**

Advanced and innovative technology concepts



## **Impact**

Research with significant impact to society and economy



## **Implementation**

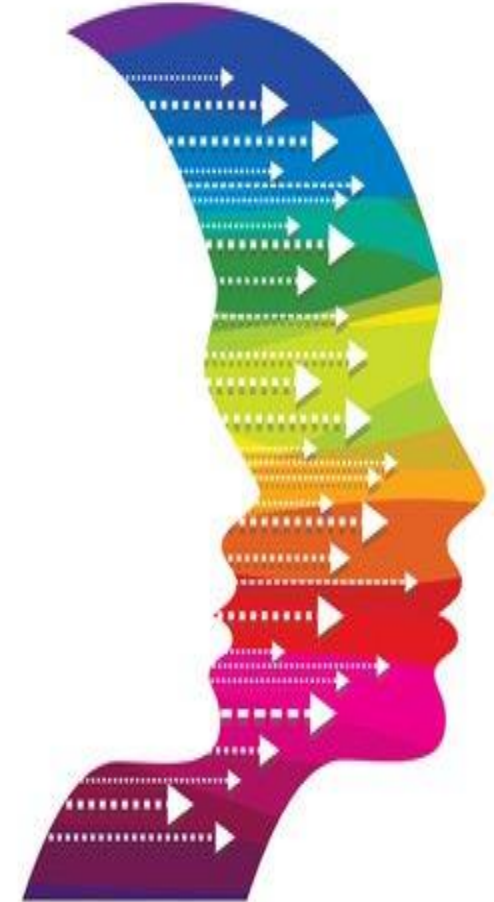
State-of-the-art organisation and management structures



# 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](http://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 screenshot displays the NRSO website interface. At the top, the NTUA logo and 'National Technical University of Athens Road Safety Observatory' are visible, along with navigation links: Home, About, Knowledge, Data, Conferences, News, Links. The main content area is divided into several sections:

- Systems:** A vertical list of logos for various road safety initiatives, including European Road Safety Observatory, European Road Safety Observatory, SafeFITS, pract-repository, and levitate.
- Cooperations:** A vertical list of logos for partner organizations, including Europe, UNECE, ETSC, CEDR, FEHRL, ectri, ERF, and POLIS.
- PHOEBE - 1st Newsletter, May 2023:** A featured article about the PHOEBE research project, highlighting the release of the 1st Newsletter and the project's goals.
- SHOW - 7th Newsletter, May 2023:** A featured article about the SHOW research project, highlighting the release of the 7th Newsletter and the project's goals.
- NTUA - Road Safety Research Challenges Workshop, Athens, May 2023:** A featured article about the workshop, highlighting the participation of NTUA and the workshop's goals.

On the right side, there is a search bar and a sidebar with additional information:

- Search:** A search bar with a magnifying glass icon.
- 2023 Road Safety Research Challenges:** A banner for the 2023 Road Safety Research Challenges.
- RSS 2022:** A banner for the Road Safety and Sustainability 2022 conference.
- www.transport.ntua.gr:** A link to the NTUA transport website.
- 2021:** A banner for the 2021 Road Safety Update.
- Upcoming Events:** A section listing upcoming events, including TRA, POLIS, and others.
- Subscribe to our newsletter:** A section with a form to enter an email address to subscribe to the newsletter.
- StreetsforLife:** A banner for the StreetsforLife initiative.
- RethinkMobility:** A banner for the RethinkMobility initiative.



# The NRSO website (2/2)

A dynamic website with a wealth of information:

[www.nrso.ntua.gr](http://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 titled "Europe" listing various international organizations and conferences, including UNECE, ETSC, CEDR, FEHRL, ectri, ERF, and FEVR. A "Worldwide" section follows with logos for the International Transport Forum and World Health Organization.
- Road Safety Conferences:** A central section with a large image of a conference and a list of upcoming events for 2024 and 2023, such as DD2024, 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, ITSC2023, EU Road Safety Results Conference, and 8th ITS Hellas Conference.
- Upcoming Events:** A section on the right side featuring logos for TRA, POLIS, and other upcoming events.
- Search:** A search bar at the top right.
- Subscribe:** A newsletter subscription form on the right side.
- Archives:** A section at the bottom right with logos for StreetsforLife, RethinkMobility, and Tag 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

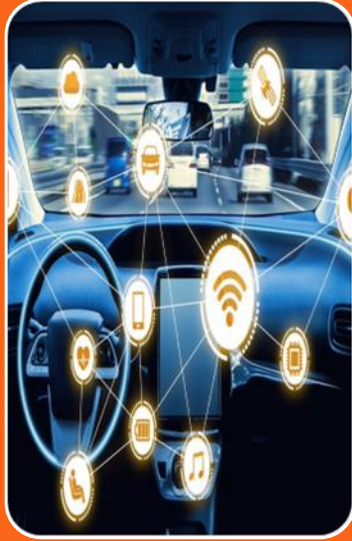




# The Road Safety Research Areas



Traffic  
Automation  
and  
Safety



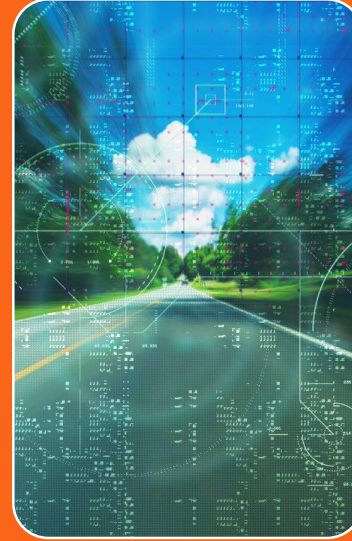
Driver  
Behaviour  
Telematics



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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