

# TRAVISIONS

## *TRA Visions 2014 - Two competitions in one*

- **Research student competition** to stimulate interest among young researchers/students in sustainable surface transport.
- **EU Champions of Transport Research competition** for senior researchers in innovative surface transport concepts based on results only from EU-funded projects.

# *Student competition*

- Aimed at University and Technical Institutes students pursuing bachelor degrees and higher.
- Opportunity for students to showcase their work in an international stage at Transport Research Arena (TRA) 2014 Conference between 14-17th of April 2014 in Paris.



# Student Competition Research Areas 2014

## Transport Modes

### A. Road

- Highways,
- Urban and rural roads,
- Passenger and freight transport,
- Cycling,
- Pedestrian

### B. Rail

- High-speed,
- Passenger and freight railways,
- Urban and light rail systems

### C. Waterborne

- Maritime,
- In-land waterborne,
- Short sea shipping,
- Deep Sea Shipping
- Passenger transport and cruises,
- Floating infrastructures and support vessels
- Container Shipping,
- Dredging

### D. Cross-modality

- Co-modality,
- Inter-modality,
- Combined transport,
- Interfaces,
- Intermodal terminals,
- Integrated infrastructures,
- Public transport



# *Student Competition Research Areas 2014*

## Research Topics/Areas

- Environment and Energy,
- Industry Competitiveness
- Safety and Security
- Logistics and Mobility Systems and Services
- Transport Policy Research/Socio economic/  
Human sciences
- Transport Infrastructures
- Vehicles & Vessels Technologies



# *Student Competition Research Areas 2014*

## Environment and Energy

- Electromobility,
- Greenhouse gas and pollutant emission,
- Optimisation of energy use,
- Alternative fuels and powertrain
- Fuel infrastructures,
- Impact on biodiversity,
- Noise and vibration,
- Electromagnetic compatibility,
- ITS connectivity and Smart System/Electronics



# *Student Competition Research Areas 2014*

## Industry Competitiveness

- Market uptake,
- Innovation process,
- Demonstrators,
- Field operation tests,
- Cost effectiveness,
- Technical harmonisation,
- Industrial property rights,
- Small and medium enterprises,
- Industrial cooperation,
- Innovative procurement



# *Academic Competition Research Areas 2014*

## **Safety and Security**

- Sustainable & efficient mobility,
- Innovative services,
- Passenger transport,
- Freight transport,
- Urban and local/medium and long distance,
- Congestion management, nomadic devices



# *Student Competition Research Areas 2014*

## **Logistics and Mobility Systems and Services**

- Accident mitigation,
- Crashworthiness,
- Vulnerable users,
- Infrastructure-vehicle-driver aspects,
- ITS solutions,
- Health and biomechanics,
- Energy absorption,
- Fire performance,
- Blast resistance,
- Failure investigation,
- Security and crisis management,
- Risk management,
- Resilience





# *Student Competition Research Areas 2014*

## Transport Policy Research/Socio economic/Human sciences

- Roads, Tunnels,
- Bridges,
- Pavements,
- Railtracks,
- Stations,
- Seaports & Marinas,
- Offshore platforms,
- Canals,
- Locks,
- Geotechnics,
- Design,
- New materials and technologies,
- ICT infrastructures,
- Asset management sensing and monitoring



# *Student Competition Research Areas 2014*

## **Transport Infrastructures**

- Transport strategy and planning,
- Strategic transport technology plan,
- Pricing,
- Behaviour,
- Perception,
- Accessibility,
- Micro and macro-economics,
- Gender issues,
- Ageing issues,
- Land use planning and management,
- Regulatory environment,
- New investment models



# *Student Competition Research Areas 2014*

## **Vehicles & Vessels Technologies**

- Cars,
- Trucks,
- Buses,
- Powered 2 wheelers,
- Bicycles,
- Trains,
- Ships, On-board equipment,
- Offshore wind farm support vehicles
- On-board ICT,
- New materials



# Evaluation Criteria

## Scientific Merit (60%)

Research must:

- emphasize on novelty, or at least an innovative application of existing knowledge.
- address an important problem
- advance scientific knowledge by the completion of this project
- be appropriate to the research field being investigated
- have conceptual framework, design, methods, and analyses adequately developed, well-integrated, and appropriate to the aims of the project
- acknowledge potential problem areas and consider alternatives
- have adequate support for the project



# *Evaluation Criteria*

## Impact (20%)

Research must:

- show adequate relevance to the transport industry
- provide support that it is applicable within the trade
- be appropriate to the current (or future) trends within the industry
- propose how it could be incorporated into the system, if not already present
- not be out-dated



# Evaluation Criteria

## Presentation (20%)

Research must:

- clearly state the primary theme or purpose
- contain properly sequenced ideas
- have depth of communications appropriate to the audience
- include words and terms appropriate to the audience
- not exceed the length appropriate to the competition
- follow punctuation, spelling and formatting conventions
- observe correct grammar in the written text
- secure the audience's attention at the beginning
- use visual aids and produce a presentation of up to 5 slides with pictures
- use the correct level of formality



# Process

- All participants invited to register their ideas and submit Title and short abstract **by January 2014**.
- Also had **until end of January** to develop and submit idea, which was meant to be report based on Final Project Template accompanied by supporting documents.
- Followed by Evaluation of Ideas period during which a judging panel determined which were top three ideas per mode.
- Some **104 students** participated, submitting **51 student projects** from **18 different EU countries** and **34 different universities**.



## Prizes and awards

Awards and prizes of top 3 winners per mode announced during award ceremony at end of opening session on first day of TRA2014 (14<sup>th</sup> April 2014).





# Road winners

Title	Team members	University	Country
Metamaterials for vibro-acoustic isolation	Claus Claeys,	KU Leuven	BELGIUM
Wheeled Mobile Driving Simulator for Urban Traffic Simulation	Alexander Betz, Paul Wagnerl	Technische Universität Darmstadt	GERMANY
Stochastic optimization of advance traffic signal control	Junchen Jin	KTH Royal Institute of Technology	SWEDEN



# Rail winners

Title	Team members	University	Country
SELF PRESTRESSED CONCRETE	Alessandro Nardinocchi	Università Politecnica delle Marche	ITALY
Location Choice Advisor for Internal Migration in the European Union	Dimitrios Efthymiou	National Technical University of Athens	GREECE
Conception of driver's risky state detection system	Nedjemi Rachedi, Eddine Djamel	University of valenciennes and hainaut cambresis	FRANCE



# Waterborne winners

Title	Team members	University	Country
Green Offshore Crew Tender Concept	Morten Ahlström Kai Schlösser Julian Herbel Jan-Christoph Nagel Julia Ludwig Tobias Kreklow	Hochschule Bremen	GERMANY
Robust Design Optimization for Operational Profiles	Bailly Guimaraes, Helio	University of Liege	BELGIUM
An Electric Transport Design For Suez Canal	Konstantinos Mammous Andreas Alvanis, Panagiotis Tzotzolis, Abdulrahman Shunaiber Adel Alenezi	University of Newcastle Upon Tyne	UNITED KINGDOM



# EU Champions of Transport Research

- First **EU Champions of Transport Research Competition** was excellence award for leading surface transport researchers in European projects which have proven impacts
- In first stage, candidates applied through the TRA Visions website, showing how their research was impactful.
- Entrants initially reviewed by judging panel, followed by shortlisting workshop held in Brussels
- Awards given out as part of Strategic Session 13 on “*Horizon 2020: Innovating Mobility, Mobilising Innovation*”.





## Winner: Cross-modal

Eugene O'Brien

UCD & ROD-IS



EU CHAMPIONS OF  
TRANSPORT RESEARCH

★ 2014 ★

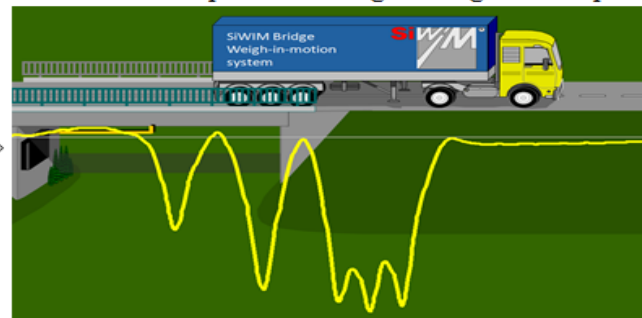
- Over several EU funded projects, Prof O'Brien's research resulted in more sustainable infrastructures by extending their lives through quantification of risks, especially risk of bridges being overloaded.
- Research developed road pavement and railway track deterioration models to predict remaining service life of infrastructures and allow for more cost efficient maintenance planning, preventing overdesign while ensuring that pavements and track are sufficient to remain in service for entire design life.
- In Ireland, Prof OBrien's work on Weigh-in-Motion resulted in increase in allowable gross weight of 6-axle trucks from 44 to 46 tonnes. His company demonstrated increase would have little effect on risk of overload on bridges and positive benefits of reducing cost of transport, reducing fuel consumption per tonne of freight and reducing cumulative damage to road pavements.
- At European and world level, research on bridge traffic loading is identifying nature of vehicles that govern safety of bridges - these findings have made it possible to keep many bridges in service for much longer.
- Result is bridge stock with longer average bridge life, reducing carbon footprint of bridges and demand for non-renewable materials.

## Bridge Weigh-in-Motion

1. Install sensors under bridge.



2. Measure response of bridge during vehicle passage.



3. Use response to calculate vehicle weight.



Axle Number	Axle Weight (kN)
1	70
2	85
3	82
4	81
5	81
<b>Gross Weight</b>	<b>399</b>

BridgeMon aims to improve the accuracy of the SiWIM Bridge-WIM system which is marketed by the Slovenian company, Cestel d.o.o. This will allow accurate evaluation of traffic loading.



**Winner: Rail**  
Eckehard Schneider  
Universität Braunschweig



- Professor Schneider develop railway safety and control and ensure results are applied to railway sector
- Promoting trans-European approach to rail research and using motto *safer traffic through automation mimicking nature*, research explored three topics:
  - European Railway Train Control System (ETCS)
  - Modeling and quantification of safety in general and for level crossings and maintenance in detail
  - Board autonomous localisation by European GNSS Galileo/EGNOS
- Work contributed to policy development in formalisation of ETCS, development of PROFUND approach and international standard IEC 62551.
- Involved with assessment of safety in railway sector, in particular with respect to Common Safety Indicators (CSI) and Common Safety Targets (CST), e.g. together with Swiss Federal Authority for Transport (BAV).
- Initiated and coordinated EU project SELCAT (Safer Level Crossing and Appraisal Technology) for safety of railroad crossings, most vulnerable area in railways. Together with 24 members from 9 European states and third target states China, Russia, Japan and Morocco, data from nearly half of world's population level crossing accidents evaluated.
- In cooperation with European Railway Agency (ERA), structuring of level-crossing classes originated.
- New web-based database created to railroad crossing accidents, now taken over by UIC and ELCF.
- Currently working on new approach with BAV to document CSI transparently.
- Level crossing case study is well known benchmark for academic research, especially in hybrid systems modelling.







**Winner: Waterborne**  
Apostolos Pananikolaou  
National Technical University of Athens  
Ship Design Laboratory



- Ship design is complex endeavour requiring successful coordination of many disciplines and individual experts to arrive at valuable design solutions.
- Inherently coupled with design process is design optimisation, namely selection of best solution out of many feasible ones on basis of set of criteria.
- Systemic approach to ship design may consider ship as complex system integrating variety of subsystems and components
- Independently, considering that ship design should actually address whole ship's life cycle, it may be split into various stages traditionally composed of concept/preliminary design, contractual and detailed design, ship construction/fabrication process, ship operation for economic life and scrapping/recycling.
- Optimal ship is outcome of holistic optimisation of entire ship system over whole life cycle.
- But even simplest component of optimisation problem, namely first loop is complex enough to be simplified (reduced) in practice.
- Inherent to ship design optimisation are also conflicting requirements resulting from design constraints and optimisation criteria, reflecting interests of various ship design stakeholders.





## Winner: Road and Overall Winner

Astrid Linder

Swedish National Road and Transport Research Institute  
(VTI)



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★ 2014 ★

- Project achieved extensive scientific impact worldwide by introducing revolutionary knowledge to field of occupant dummy models used for assessing and developing enhanced protective systems for vehicles.
- In addition, world's first virtual model of average female crash test dummy developed by Dr. Linder and her team in ADSEAT project and is already commercially available. Model, EvaRID, made it possible to address occupant protection for both average female and male.
- Joint effort between ADSEAT project partners in combination European Commission funding made it possible for Dr Linder and team to establish opportunities for development of future vehicle safety systems suitable for assessing male and female risk alike.



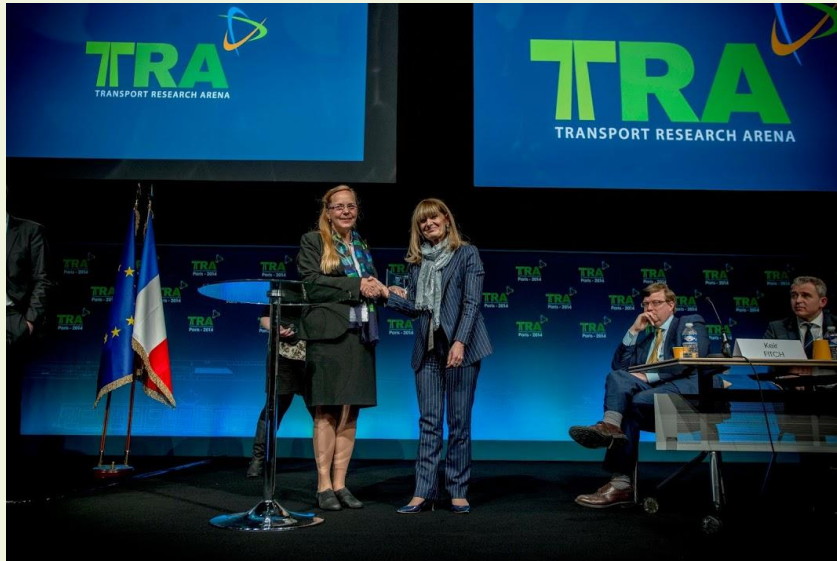
EvaRID (Eva female, RID – Rear Impact Dummy), world's first virtual crash test dummy representing average female

- Commercially available virtual dummy model of average female, EvaRID, as well as prototype hardware model, in need of further development, created in ADSEAT project symbolises unique initial step in direction towards gender equality in vehicle safety.
- Models used as research tools in conjunction with current low severity rear impact model of average male, BioRID, when assessing safety performance of car seats.
- Research results show how vehicle safety assessment can be improved and have potential to influence consumer and legislation testing, and reduce risk of soft tissue neck injuries in future





# Road winners and all winners



## *Further Information*

For further information, visit

<http://www.travisions.eu>

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