

## Symposium 2021 Breakout Session Title:

### B304-Automated Vehicle (AV) to Other Road User Communications: What Have We Learned from Research?

#### Session Contact/Organizers:

Natasha Merat, Professor of Human Factors and Transport Systems, University of Leeds

#### Session Description

As the level of automation in vehicles increases (SAE Level 4+), the role of humans will change from controllers of the vehicle to “passengers and occupiers”, observing the behavior of the vehicle, also allowed to engage in other, non-driving related, activities, such as reading their emails, using the vehicle’s infotainment system, or even sleeping. This change in role of the driver means that the AV will need to communicate its intentions when interacting with other road users in a mixed, shared, traffic environment, containing pedestrians, cyclists and other drivers. This workshop will start with providing a summary of results from recent projects conducted in Europe, the US and Asia on this topic, including how different forms of external communication by the AV can assist pedestrians interacting in the same road space. Opportunities for further research will be discussed with the audience, through small breakout sessions.

#### Goals/Objectives/Outputs

- Provide a summary of the work on the use of external HMIs for communication with pedestrians
- An understanding of what vehicle-and road-based cues are useful for communication by AVs
- Overview of a real-world study on interaction of pedestrians with AVs
- Create new Research Needs Statements to further the state of the art

#### Agenda

##### 8:00-9:00 – Introduction to the session, and panel presentations

- Natasha Merat, University of Leeds

##### Speakers

- Dr Josh Domeyer, *Crosswalk signage influences driver and pedestrian perceptual control during encounters*, Toyota, USA
- Prof Tatsuru Daimon, *Communication of low-speed automated driving shuttles and risky behavior of other vehicles*, Keio University, Japan
- Dr Yee Mun Lee, *Pedestrian-AV interactions: What do we know now, and what else do we need to know?* University of Leeds, UK
- Prof Klaus Bengler, *From HMI to HMIs – How to Integrate Different Modalities for External Communication*, Technical University of Munich, Germany
- Dr Yael Shmueli, *Theoretical foundations and methodical steps for XMI design*, General Motors, Israel

**9:00-9:30** – Panel discussion and response to audience questions

**9:30-9:45** – Short break and move to smaller breakout rooms

**9:45:-10:45** – Smaller group discussions, working towards research needs statements

Moderated by panel members and

- Dr Debargha Dey, TU Eindhoven, The Netherlands
- Prof Marieke Martins, TU Eindhoven, The Netherlands
- Dr Ruth Madigan, University of Leeds, UK
- Dr John Campbell , Exponent, USA

**10:45-11:00** Quick overview of main conclusions from each small breakout group