



## Dr. Anil Kumar – Summary of 2021 Project Awards

### 1. Supportive Interface Design Guidelines

Award: **\$77,468** Sponsor: **Honda Research Institute, 2021**

Situational awareness should increase a driver's trust and lead to better secondary task performance. This implies that research is required to understand the factors that assist in designing systems to aid the driver/user. In general, any type of displays should be designed to allow drivers to glance at them easily and quickly with minimal tasking of the visual attention. Two common forms of displays for presenting information to drivers are head-up displays (HUD) and head-down display (HDD). This project will focus on the HUD interface, which could be distracting based on numerous factors including information content. The goal of this project is to assess an Augmented Reality ("AR")-based in-vehicle supportive interface given different presenting strategies and different traffic scene contexts. This collaboration will center on data collection and analysis of drivers' behavior and cognitive status e.g. workload and situation awareness when interacting with this interface.

### 2. Remote Human Factors Validation study of 3 mg sumatriptan autoinjector for migraine patients.

Award: **\$19,701.** Sponsor: **Noble, an Aptar Pharma company**

Laboratory research has decreased in a wide range of disciplines in the present landscape of COVID-19 pandemic. Almost all academic institutions (and consultants) have suspended in-person data collection and are not permitting any lab-based studies to proceed further. One industry that is heavily impacted is the medical device manufacturers who need to provide human factors validation to receive U.S. Food and Drug Administration (FDA) approval. Furthermore, in the most recent 2020 HFES annual conference, US FDA commented that they were currently "not aware of any data that supports the use of remote HF validation testing or of any consensus scientific guidelines or standards that can inform an acceptable remote HF testing approach. The objective of this study is to replicate the objectives of the original in-person study, which were to evaluate the design, ease of use, intuitiveness, and risks of a 2 stage autoinjector, determine whether the device can be correctly, safely, and effectively used by the intended user population without patterns of preventable use errors that would result in harm to the user, and confirm the device labeling and instructions for use (IFU) to support users in mitigating high risks and use contexts.

### 3. Understanding Safety and Usability of Personal Vehicles for Non-Driving Individuals with Disabilities and their Families

Award: **\$4,883.60.** Sponsor - **Mineta Transportation Center Grant #21-1100-5726.**

Funding Source: U.S. DOT, Office of the Assistant Secretary for Research and Technology

The project idea originated from Hannah Bowman, who is a graduate student in the HFE program. She is the Co-Principal Investigator on this project.

The shared personal vehicles of people with disabilities and their household family members plays an important role in the mobility and overall health and well-being of all involved people. Families that include a non-driving disabled member are more likely to be low-income and often struggle with the costs of operating a family car, but due to insufficient public transportation options, own vehicles despite their prohibitive cost. This study intends to provide a holistic understanding of how operating a personal vehicle used to transport a non-driving disabled individual influences the comfort, safety, and ease of use of all involved actors. Subsequent results from this research aim to provide insights and design recommendations that are actionable within the commercial vehicle industry; while providing visibility, representation, and perspective into this largely overlooked group of drivers and passengers