Time & Location: April 3, 2018 at 10:30 AM in ENG2 312L
Title: ASSESSING THE IMPACT OF MULTIVARIATE STEERING-RATE VEHICLE CONTROL ON DRIVER PERFORMANCE IN A SIMULATION FRAMEWORK

When a driver turns a steering wheel, he or she normally expects the vehicle’s steering system to communicate an equivalent amount of signal to the road wheels. This relationship is linear, having little or no response variation, regardless of the steering wheel’s position within its rotational travel or vehicle speed. This linear steering paradigm in passenger vehicles has gone largely unchanged since mass production of passenger vehicles began in 1901. However, as more, electronically controlled steering systems appear in conjunction with development of autonomous steering functions in vehicles, an opportunity to advance the existing steering paradigms arises. In order to investigate opportunities such as this, three hypotheses were tested as part of a study to comparatively optimize novel steering systems that incorporate multivariate steering response:

- **H1:** Drivers in a simulated environment will perform better at moderate speeds using vehicles equipped with Multivariate Steering-rate Vehicle Control, compared with vehicles equipped with conventional 900° steering systems.
- **H2:** Drivers in a simulated environment will prefer using vehicles equipped with Multivariate Steering-rate Vehicle Control, compared with vehicles equipped with conventional 900° steering systems.
- **H3:** Male drivers in a simulated environment will perform no differently from female drivers at moderate speeds using vehicles equipped with Multivariate Steering-rate Vehicle Control.
- **H4:** Younger drivers in a simulated environment will perform better at moderate speeds using vehicles equipped with Multivariate Steering-rate Vehicle Control than older drivers.

Additionally, the study presents an open-source framework by which a human-factors approach to examination and evaluation of alternative steering systems using Modeling and Simulation methods can be leveraged to track and score human performance. Using this framework, this study produced results that justify further research and development of novel steering systems that could play a role in shaping the landscape of emerging technologies.

Major: Modeling and Simulation

Educational Career:
- Bachelor's of Applied Mathematics, BA, 1986, Florida Atlantic University
- Master's of Modeling and Simulation, MS, 2011, University of Central Florida

Committee in Charge:
- Patricia Bockelman Morrow, Chair, Department of Modeling and Simulation
- Glenn Martin, Department of Modeling and Simulation
- Mustafa Mouloua, Department of Psychology
- Thomas O'Neal, Office of Research and Commercialization
- Petros Xanthopoulos, Stetson University, School of Business Administration
- Waldemar Karwowski, Department of Industrial Engineering and Management Systems

Approved for distribution by Patricia Bockelman Morrow, Committee Chair, on March 19, 2018.

The public is welcome to attend.