



## **MANUEL MEZA-ARROYO, Ph.D., P.E., CHFP SENIOR MANAGING CONSULTANT**

[mmarroyo@engsys.com](mailto:mmarroyo@engsys.com)

Dr. Meza has significant experience in the field of industrial and human factors engineering. He specializes in human perception and cognition, biomechanics, the effects of light and aging on the visual system. He also has significant experience in experimental design, and the implementation of statistical analyses and computational modeling. He has conducted and participated in multiple multidisciplinary investigations involving automobile and trucking accidents, nighttime vehicle-pedestrian collisions; industrial and occupational injuries; slip/fall/trip/misstep incidents; and analysis of warnings, procedures and instructions. Dr. Meza's research has included the study of eye movements and visual attention during driving tasks, visual information processing for collision detection, visual perception under low-illumination conditions, occupant kinematics during low-speed impacts, and the photometric characteristics and human factors implications of different headlamp technologies for the transportation industry. At ESi, Dr. Meza implements human-subject testing to assess human performance and behavior by employing tools such as motion capture technology, calibrated photography, tri-axial accelerometers, binaural microphones, and custom programming for various applications including statistics, biomechanics, and psychophysics. He has presented his findings in a variety of scientific journals and international forums. Dr. Meza speaks fluent English, Spanish, and Portuguese.

### **Areas of Specialization**

Perception and Attention  
Human Error Analyses  
Night and Daytime Visibility and Conspicuity  
Biomechanics and Human Motion Analysis  
Human Factors Engineering  
Risk Assessment, Experimental Design & Statistical Data Analysis

### **Education**

Ph.D., Industrial Engineering, Texas Tech University, Lubbock, TX, 2015  
M.Sc., Industrial Engineering, Texas Tech University, Lubbock, TX, 2009  
B.Sc., Industrial & Systems Engineering, Tecnológico de Monterrey, México, 2007

### **Licensed Professional Engineer (P.E.)**

State of Michigan – License No.: 6201310563  
Professional Industrial & Systems Engineer – SEP Cédula: 5456536, México

### **Professional Certification**

Certified Human Factors Professional (CHFP) by the Board of Certification in Professional Ergonomics (BCPE) Certification No. 1973

## **Professional Affiliations/Honors**

### **Human Factors & Ergonomics Society (HFES)**

Member

### **Illuminating Engineering Society (IES)**

Member

### **Society of Automotive Engineers (SAE)**

Member

### **Alpha Pi Mu (Industrial Engineering Honor Society)**

Awarded

### **Recipient of:**

Raider Rojas National Alumni Scholarship (2014)  
American-Mexican Waterman Friendship Scholarship (2008-2015)  
MM Ayoub Ergonomic Scholarship (2009)

## **Synergistic Activities**

Reviewer, Journal of Failure Analysis and Prevention  
SAE Manuscript Reviewer  
HFES member of: Virtual Environment & Forensics Professional Technical Groups

## **Positions Held**

### **Engineering Systems Inc., Ann Arbor, MI**

Senior Managing Consultant, 2023 - present  
Senior Consultant, 2022 – 2023  
Sr. Staff Consultant, 2020 – 2021  
Staff Consultant, 2016 – 2019  
Research Analyst, 2015 – 2016

### **University of Texas, Arlington, TX**

Adjunct Professor, Summer 2015

### **Texas Tech University, Lubbock, TX**

Research-Teaching Assistant and Graduate Instructor, 2007-2015

### **ALSTOM Power, Morelia, Mich. México**

Tendering Engineer (Intern), Jan 2007 – May 2007

### **CIETec, Tecnológico de Monterrey, Morelia, Mich. México**

Researcher - Data collection and analysis, 2005-2007

## Continued Education

**RP-43, Lighting for People in Outdoor Environments**, Certificate of Attendance (IES, March 2021).

**Roadway Lighting – Lighting and Health**, Certificate of Attendance (IES, October 2020).

**Traffic Signal Timing Records Interpretation and Analysis**, Certificate of Achievement (Traffic Signal Academy, University of Tennessee, October 2020).

**Show Me the Data: Does LED Lighting Influence Roadway Safety?**, Certificate of Attendance (IES, July 2020).

**Germicidal Ultraviolet Disinfection in the Days of COVID-19**, Certificate of Attendance (IES, May 2020).

**Traffic Crash Reconstruction for The Forensic Engineer**, Certificate of Achievement (Northwestern University, March 1, 2019).

**A New Measure of Color Discrimination**, Certificate of Attendance (IES, November 2018).

**Automotive Lighting: Testing and Requirements Seminar**, Certificate of Achievement (SAE International, April 6, 2017).

**Automotive Lighting: Design and Technology Seminar**, Certificate of Achievement (SAE International, April 4, 2017).

**Vehicular Crash Reconstruction Methods Seminar**, Certificate of Achievement (SAE International, Troy, MI, May 2016).

## Technical Reports

Dr. Meza has authored technical reports addressing various topics, including: low-illumination accidents, visual perception and conspicuity, auditory warnings and perception, trip/fall/slip/misstep incidents, headlamp and street illumination, and statistical analyses for industrial processes.

## Publications & Presentations

“Flip-Flops: A Survey of Risk Perception and Acceptance.” Fortenbaugh, D., Shibata, P., **Meza-Arroyo, M.**, Thobe, K., & Welch, T. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting. Sage CA: Los Angeles, CA: SAGE Publications. 2022, September, Vol. 66, No. 1, pp. 513-517.

“Enhancing Contrast-Sensitivity Charts for Validating Visual Representations of Low-Illumination Scenes.” Sprague, James K, **Manuel Meza-Arroyo**, Peggy Shibata, and Jack L Auflick. *SAE 2019 World Congress & Exhibition*, 2019.

“The Kinematic Analysis of Occupant Excursions and Accelerations During Staged Low Speed Far-Side Lateral Vehicle-to-Vehicle Impacts.” Peggy Shibata, Julius Roberts, James Sprague, Alyson Light, Jacob Stegemann, **Manuel Meza-Arroyo**, Shawn Capser. *SAE 2019 World Congress & Exhibition*, 2019.

“Head Acceleration Measurements During Vehicle Driving Tasks and Lateral Impacts Relative to Head Accelerations During Activities Of Daily Living.” Peggy A. Shibata, Anne C. Mathias, Alyson E. Light, **Manuel Meza-Arroyo**, James K. Sprague, Amber Rath Stern. Rocky Mountain Bioengineering Symposium, 2019.

- “Comparative Lumbar Spine Acceleration Data During Activities of Daily Living, Tasks of Daily Driving, and Low Speed Lateral Vehicle Impacts.” Peggy A. Shibata, Anne C. Mathias, Alyson E. Light, **Manuel Meza-Arroyo**, James K. Sprague, Amber Rath Stern. Rocky Mountain Bioengineering Symposium, 2019.
- Final Report: Phase IV of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, **Meza-Arroyo, M.**, Shibata, P., Sprague, J. Woods, S. (2021). U.S. Department of Transportation. Federal Railroad Administration. Office of Railroad Policy and Development Office of Research and Development Washington, DC 20590.
- Final Report: Phase III of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, **Meza-Arroyo, M.**, Shibata, P., Sprague, J. (2021). U.S. Department of Transportation. Federal Railroad Administration. Office of Railroad Policy and Development Office of Research and Development Washington, DC 20590.
- Final Report: Phase II of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, **Meza-Arroyo, M.**, Shibata, P., Sprague, J., Capser, S. (2019). U.S. Department of Transportation. Federal Railroad Administration. Office of Railroad Policy and Development Office of Research and Development Washington, DC 20590.
- Final Report: Phase I of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, **Meza-Arroyo, M.**, Shibata, P., Woods, S. (2018). U.S. Department of Transportation. Federal Railroad Administration. Office of Railroad Policy and Development Office of Research and Development Washington, DC 20590.
- “Continuous Response Monitoring of Relative Time-to-Contact Judgments: Does Effective Information Change During an Approach Event?” DeLucia, P. R., **Meza-Arroyo, M.**, Baurès, R., Ranjit, M., Hsiang, S., & Gorman, J. C. 2016. *Ecological Psychology*, 28(1), 1–22.  
<http://doi.org/10.1080/10407413.2016.1121735>.
- “Analysis of Eye Movements and Collision Judgments in Younger and Older Observers for the Development of a Reinforcement Learning,” Ph.D. Dissertation, Texas Tech University, Lubbock, TX. 2015.
- “What’s After College?” Guest Lecturer, Tecnológico de Monterrey, IE Senior Project Course Morelia, Mich. México, 2014.
- “Visual Attention Differences between Younger and Older Drivers,” Seminar, Guest Lecturer, Department of Environmental and Occupational Health at Texas A&M HSC. College Station, TX, 2013.
- “The effect of music genres on oxygen uptake during a cycling exercise.” Chun, Y. J. & **Meza, M.** (2011). Proceedings of 2011 Texas Regional Human Factors & Ergonomics Conference, 2011.
- “Useful Field of View of Aging Drivers as a Design Tool for In-Vehicle Visual Aids,” **Meza, M.**, Patterson, P. & Nakayasu, H. (2009). HFES 53rd Annual Meeting, San Antonio, TX, October 2009.
- “Analysis of Visual Attention and Useful Field of View among Experienced, Inexperienced and Older Drivers,” **Meza, M.**, Patterson, P. & Nakayasu, H. (2009). Paper presented at the 17th World Congress on Ergonomics, IEA 2009, Beijing, China, August 2009.
- “Comparing Visual Performance & Useful Field of View of Older and Younger Drivers,” **Meza, M.**, Patterson, P. & Nakayasu, H. (2009). Rocky Mountain Bioengineering Symposium. Milwaukee, WI. April 2009.
- “Comparing Visual Performance & Useful Field of View of Older and Younger Drivers,” **Meza, M.**, Patterson, P. & Nakayasu, H. (2009). Rocky Mountain Bioengineering Symposium. 46th International ISA Biomedical Sciences Instrumentation Symposium, Milwaukee, WI. April 2009. ISA, Volume 476. pp. 83-85.

“Analysis of Visual Attention and Useful Field of View among Experienced, Inexperienced and Older Drivers,” **Meza, M.**, Patterson, P. & Nakayasu, H. (2009). Instrument Society of America. Biomedical Sciences Instrumentation, February 2009; 45: 83-88.

“Comparisons of Visual Performance and Useful Field of View among Drivers in a Simulator,” M.Sc. Thesis, Texas Tech University, Lubbock, TX. (2009)

“Relationship between Visual Attention and the Surrounding Environment During Driving Tasks: A Cognitive Experiment,” **Meza, M.** (2008). INFORMS Southwest Regional Conference, Texas A&M University. College Station, TX, April 2008.