



MANUEL MEZA-ARROYO, Ph.D., AHFP STAFF CONSULTANT

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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; and slip-and-fall incidents. 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, 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

Visual Perception and Attention
Human Error Analyses
Night and Daytime Visibility and Conspicuity
Biomechanics and Human Motion Analysis
Human Factors Engineering
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.)

Professional Industrial & Systems Engineer – SEP Cédula: 5456536, México

Professional Certification

Associate Human Factors Professional (AHFP) by the Board of Certification in Professional Ergonomics (BCPE) certification No. 1973

June 2019

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)

Member

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
Member, HFES Performance and Perception Technical Group (PPTG)

Positions Held

Engineering Systems Inc., Ann Arbor, MI

Staff Consultant, 2016 – Present
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

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).

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

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

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

Technical Reports

Dr. Meza has authored technical reports addressing various topics, including: low-illumination accidents, visual perception and conspicuity, trips-and-falls, headlamp and street illumination, and statistical analyses for industrial processes.

Publications & Presentations

“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. (*Submitted for publication*).

“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. (*Submitted for publication*).

“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>.

“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, 2/2009; 45: 83-88.

- “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.
- “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.
- “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.
- “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.
- Comparisons of Visual Performance and Useful Field of View among Drivers in a Simulator,” M.Sc. Thesis, Texas Tech University, Lubbock, TX. (2009)
- Final Report: Phase I of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, **Meza-Arroyo, M.**, Shibata, P., (2018). 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.**, (*Submitted to FRA*). U.S. Department of Transportation. Federal Railroad Administration. Office of Railroad Policy and Development Office of Research and Development Washington, DC 20590.