Manuel Meza-Arroyo

PhD, PE, CHFP

Director, Senior Managing Consultant

Dr. Meza-Arroyo has extensive experience in the field of industrial and human factors engineering. He specializes in human perception and cognition, and occupational biomechanics. He has significant experience in experimental design, the application of statistical analyses, and the implementation of computational modeling for assessing human performance. He has conducted and participated in multiple disciplinary investigations involving automobile and trucking accidents, nighttime or low-illumination incidents; industrial and occupational injuries; slip/fall/trip/misstep incidents; and the analysis of warnings, procedures and instructions.

Dr. Meza-Arroyo'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-Arroyo implements human-subject testing to assess human performance and behavior by employing tools such as motion capture technology, calibrated photography and videography, tri-axial accelerometers, binaural microphones, and custom programming for various applications including statistics, biomechanics, and psychophysics.

Dr. Meza-Arroyo has authored multiple 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.

Education

PhD, Industrial Engineering. Texas Tech University. Lubbock, TX, 2015

MS, Industrial Engineering. Texas Tech University. Lubbock, TX, 2009

BS, Industrial & System Engineering. Tecnológico de Monterrey. Mexico, 2007

Contact Information

mmarroyo@engsys.com

(734) 794-8109

ESi Ann Arbor

1174 Oak Valley Drive
Ann Arbor, MI 48108

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

Licenses & Certifications

- State of Michigan P.E. License 6201310563
- Professional Industrial & Systems Engineer – SEP Cédula: 5456536, Mexico
- Certified Human Factors Professional (CHFP) by the Board of Certification in Professional Ergonomics (BCPE), Certification No. 1973

Languages

- English, Spanish, Portuguese.

Positions Held

Engineering Systems Inc., Ann Arbor, Michigan

- Director, 2026 - Present
- Senior Managing Consultant, 2023 – Present
- Senior Consultant, 2022 – 2023
- Senior Staff Consultant, 2020 – 2021
- Staff Consultant, 2016 – 2019
- Research Analyst, 2015 – 2016

University of Texas, Arlington, Texas

- Adjunct Professor, Summer 2015

Texas Tech University, Lubbock, Texas

- Research-Teaching Assistant and Graduate Instructor, 2007 – 2015

ALSTOM Power, Morelia, Mich. Mexico

- Tendering Engineer (Intern), January 2007 – May 2007

CIETec, Tecnológico de Monterrey, Morelia, Mich. Mexico

- Researcher- Data collection and analysis, 2005 - 2007

Continuing Education

- **RP-43, Lighting for People in Outdoor Environments** – Certificate of Attendance, IES, 2021
- **Roadway Lighting – Lighting and Health** – Certificate of Attendance, IES, 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

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

Raider Rojos National Alumni Scholarship

- Scholarship recipient, 2014

American-Mexican Waterman Friendship Scholarship

- Recipient, 2008 – 2015

Virtual Environment & Forensics Professional Technical Groups

- HFES member

Peer Reviewer

Journal of Failure Analysis and Prevention, **M. Meza-Arroyo**

SAE Manuscript, **M. Meza-Arroyo**

Publications

"When a Flashlight Looks Like a Threat: A Multifaceted Human Factors Approach in the Accident Reconstruction of a Police Officer Shooting," **M. Meza-Arroyo**, G.A. Hazime, and K.B. Zakutansky, International Society for Occupational Ergonomics & Safety, XXXVIIth Annual Occupational Ergonomics and Safety Conference, Orlando, FL, July 2025.

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

"Final Report: Phase IV of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights," **M. Meza-Arroyo**, P.A. Shibata, J.K. Sprague, and S. Woods, U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development Office of Research and Development, Washington, DC, 20590, 2021.

"Final Report: Phase III of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights," **M. Meza-Arroyo**, P.A. Shibata, and J.K. Sprague, U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development Office of Research and Development, Washington, DC, 20590, 2021.

"Final Report: Phase II of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights," **M. Meza-Arroyo**, P.A. Shibata, J.K. Sprague, and S. Capser, U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development Office of Research and Development, Washington, DC, 20590, 2019.

"Final Report: Phase I of Compliance Testing for Locomotive LED Headlights and Auxiliary Lights," **M. Meza-Arroyo**, P.A. Shibata, and S. Woods, U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development Office of Research and Development, Washington, DC, 20590, 2018.

"Continuous Response Monitoring of Relative Time-to-Conduct Judgments: Does Effective Information Change During an Approach Event?" P.R. DeLucia, **M. Meza-Arroyo**, R. Baurés, M. Ranjit, S. Hsiang, and J.C. Gorman, Ecological Psychology, Vol. 28, No. 1, pp. 1–22, 2016.
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," **M. Meza-Arroyo**, Ph.D. Dissertation, Texas Tech University, Lubbock, TX 2015.

"Comparing Visual Performance & Useful Field of View of Older and Younger Drivers," **M. Meza-Arroyo**, P. Patterson, and H. Nakayasu, Rocky Mountain Bioengineering Symposium, 46th International ISA Biomedical Sciences Instrumentation Symposium, Milwaukee, WI, ISA Vol. 476, pp. 83–85, April 2009.

"Analysis of Visual Attention and Useful Field of View among Experienced, Inexperienced and Older Drivers," **M. Meza-Arroyo**, P. Patterson, and H. Nakayasu, Instrument Society of America, Biomedical Sciences Instrumentation, Vol. 45, pp. 83 - 88, February 2009.

Presentations

"Enhancing Contrast-Sensitivity Charts for Validating Visual Representations of Low-Illumination Scenes," J.K. Sprague, **M. Meza-Arroyo**, P.A. Shibata, and J. 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," P.A. Shibata, J.M. Roberts, J.K. Sprague, A.E. Light, J.A. Stegemann, **M. Meza-Arroyo**, and S. Casper, 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," P.A. Shibata, A.C. Mathias, A.E. Light, **M. Meza-Arroyo**, J.K. Sprague, and A. 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," P.A. Shibata, A.C. Mathias, A.E. Light, **M. Meza-Arroyo**, J.K. Sprague, and A. Rath Stern, Rocky Mountain Bioengineering Symposium, 2019.

"What's After College?" **M. Meza-Arroyo**, Guest Lecturer, Tecnológico de Monterrey, IE Senior Project Course Morelia, Mich. México, 2014.

"Visual Attention Differences between Younger and Older Drivers," **M. Meza-Arroyo**, Department of Environmental and Occupational Health at Texas A&A HSC, Seminar, College Station, TX, 2013.

"The effect of music genres on oxygen uptake during a cycling exercise," Y.J. Chun and **M. Meza-Arroyo**, 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," **M. Meza-Arroyo**, P. Patterson, and H. Nakayasu, HFES 53rd Annual Meeting, San Antonio, TX, October 2009.

"Analysis of Visual Attention and Useful Field of View among Experienced, Inexperienced and Older Drivers," **M. Meza-Arroyo**, P. Patterson, and H. Nakayasu, 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," **M. Meza-Arroyo**, M.Sc. Thesis, Texas Tech University, Lubbock, TX, 2009.

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