



Résumé of  
**WILLIAM T. C. NEALE, M. Arch.**

**Kineticcorp™**

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#### **EXPERIENCE:**

Vice President, Director of Visualization, Kineticcorp, LLC, Colorado, 2005 to Present  
Accredited Traffic Accident Reconstructionist ACTAR#2571, 2013 to Present  
Motorcycle Safety Instructor, National Certification MSF# 138364, 2010 to present  
State of Colorado Motorcycle Operator Safety Advisory Board Member 2013 to 2015  
Director of Animation, Knott Laboratory, Inc., Colorado, 2000 to 2005  
Adjunct Instructor, Art Institute of Colorado, Denver, CO, 2001 to 2005  
Motorcycle Safety Quality Assurance Specialist

#### **EDUCATION:**

Washington University, Master of Architecture, 2000 (With Honors)  
Washington University, Bachelor of Arts in Architecture, 1994  
Northwestern University Center for Public Safety, Evanston Illinois:  
Advanced Crash Reconstruction Utilizing Human Factors Research, May 2017  
Motorcycle Crash Reconstruction, September 2012  
Traffic Crash Reconstruction II, May 2012  
Traffic Crash Reconstruction I, October 2011  
Vehicle Dynamics, April 2007  
University of Michigan College of Engineering, Human Factors Engineering Short Course, July 2008  
The Center for Transportation Safety, Colorado  
Motorcycle Accident Scene Management Level I, January 2011  
Motorcycle Accident Scene Management Level II, March 2011  
Motorcycle Safety Foundation (MSF) Instructors Course, Thornton, Colorado May 2010  
Motorcycle Safety Foundation (MSF) Advanced Riders Instructor Course, Aurora, Colorado, August 2014  
Total Control Advanced Motorcycle Riding Clinic, Denver Colorado, June 2009  
Motorcycle Safety Foundation (MSF) Quality Assurance Specialist Course, Golden, Colorado February – March 2020

#### **ACCREDITATION AND CERTIFICATION:**

ACTAR Accredited Traffic Accident Reconstructionist, Registration Number 2571, Sept. 2013  
Certified Motorcycle Instructor, Motorcycle Safety Foundation (MSF) of America, 2010, MSF #138364  
Certified Advanced Rider Course Instructor, Motorcycle Safety Foundation (MSF) of America, 2014, MSF #L196094

#### **APPOINTMENTS AND SELECTED MEMBERSHIPS:**

Member of the Quality Assurance Team for Colorado's Motorcycle Operator Safety Training (MOST) Program  
Instructor Representative on Colorado's Motorcycle Operator Safety Advisory Board, 2013 to 2015  
Chairman of the Animation Committee, Society of Automotive Engineers, 2009-2013  
Member of the Illumination Engineering Society of North America (IESNA) 2007 to present  
Member of the Roadway Illumination Devices Committee of Society of Automotive Engineers (2008 to present)  
Member of the Society of Forensic Engineers and Scientists  
Member of Acoustic Society of America

#### **AWARDS AND RECOGNITION:**

Silver Medalist, 32<sup>nd</sup> Annual IBPA Benjamin Franklin Award in *Professional and Technical* book series, May 2020 for the publication "Motorcycle Accident Reconstruction", Rose, Neale [2018]  
"Recognition of Dedicated Service" Motorcycle Operator Safety Training from State of Colorado, MOSAB, 2015  
"Excellence in Oral Presentation Award", Society of Automotive Engineers (SAE), 2013  
Arch T. Colwell Merit Award, Society of Automotive Engineers (SAE), 2006  
Newman Award for Acoustic Excellence (First Place Award), 2000  
Graduate Scholarship, Washington University, 1999  
Graduate Scholarship, Rice University, 1998  
Van Allen Institute Competition "Pier 54," Top 50 Design, exhibited in Gallery, 1997  
Olin Cup Finalist, Washington University, 1993

**MOTORCYCLE AND VEHICULAR ACCIDENT RECONSTRUCTION BACKGROUND:** Mr. Neale is an accredited Traffic Accident Reconstructionist through the Accreditation Commission for Traffic Accident Reconstruction. He specializes in accident reconstruction, computer visualization and simulation, lighting and visibility and photogrammetry. Mr. Neale's formal training in accident reconstruction started at the Northwestern University Center for Public Safety, where he took several accident reconstruction courses including, Advanced Crash Reconstruction Utilizing Human Factors Research, Motorcycle Crash Reconstruction, Traffic Crash Reconstruction I and II and Vehicle Dynamics. Mr. Neale's other relevant coursework includes The University of Michigan College of Engineering's Human Factors Engineering Short Course.

In addition to his training in accident reconstruction, Mr. Neale is a certified Motorcycle Safety Instructor through the Motorcycle Safety Foundation. Certification as an instructor entails several weeks of curriculum and instruction training, and passing scores in the areas of both riding skills and teaching. He has trained and administered the license waiver exam to motorcycle students in the State of Colorado in both the Basic Riders Course and the Advanced Riders Course. Mr. Neale was also selected and certified as a Quality Assurance Specialist for the Motorcycle Operator Safety Training (MOST) program in Colorado. Additional certifications include training in Motorcycle Accident Scene Management (Level I and II) through the Center of Transportation Safety in Commerce City, Colorado. Through this training, Mr. Neale researches motorcycle operations, perception reaction times, and beginner and experienced rider's capabilities. He has furthered his expertise through Motorcycle Reconstruction coursework at the Northwestern University Center for Public Safety. Based on his extensive background in motorcycle safety and instructions, he was elected to a 2-year position on Colorado's Motorcycle Safety Operation Advisory Board (MOSAB) from 2013-2015. Most recently, Mr. Neale co-authored the book, "Motorcycle Accident Reconstruction". This book, published through the Society of Automotive Engineers, is a comprehensive compendium which explores and gives insight into the science of motorcycle accident reconstruction.

For nearly two decades, Mr. Neale has worked in forensic engineering and accident reconstruction. He has investigated accidents throughout the nation and internationally that include passenger vehicles, motorcycles, bicycles, trains and airplanes. Mr. Neale's training, and experience in accident reconstruction allow him to effectively testify his findings at trial, deposition and mediation. Mr. Neale has testified in the following states: Arizona, California, Colorado, District of Columbia, Florida, Georgia, Illinois, Indiana, Kansas, Maryland, Missouri, Nebraska, Nevada, New Jersey, New Mexico, New York, Oklahoma, Tennessee, Texas, and Washington. He has been invited to present his work relating to forensic engineering at the Society of Automotive Engineers World Congress, and the Acoustic Society of America Annual Conference. He has been presented with several awards related to accident reconstruction including The Society of Automotive Engineer's 2013 "Excellence in Oral Presentation Award," and the 2006 "Arch T. Colwell Merit Award."

**LIGHTING AND VISIBILITY BACKGROUND:** Mr. Neale has managed and conducted hundreds of live visibility tests throughout the US involving tractor-trailers, trains, motorcycles and passenger vehicles. These tests have been performed in various conditions/climates including low light, sun glare, obstructions and inclement weather. His experience testing has led to research projects and publications related to both lighting and visibility. Every year, Mr. Neale is invited to review and approve the technical publications submitted to the Society of Automotive Engineers in the areas of photogrammetry, accident reconstruction and lighting and visibility. Included below are his most recent publications regarding lighting and visibility related to the visibility of motorcycle headlamps.

1. I.DRR 2018, Interactive Driver Response Research by Crash Solutions (Muttart, J. East Hampton, CT: Crash Safety Solutions, LLC) Contributor Editor and Author of Motorcycle Headlamp Beam Patterns in the Section "Headlamp Analysis".
2. **Neale, William T.C.**, McKelvey, Nathan, Pentecost, David, Koch, Dan, "Motorcycle Headlamp Distribution Comparison" SAE Paper 2018-01-0112. Detroit, MI. (2018).
3. **Neale, William T.C.**, James Marr, David Hessel, "Nighttime Videographic Projection Mapping to Generate Photo-Realistic Simulation Environments." SAE Paper 2016-01-0415. Detroit, MI. (2016).
4. **Neale, William T.C.**, David Hessel, James P. Marr, "Evaluation of Photometric Data Files for Use in Headlamp Light Distribution." SAE Paper 2010-01-0292. Detroit, MI. (2010).
5. **Neale, William T.C.**, David Hessel, "Simulating Headlamp Illumination Using Photometric Light Clusters." SAE Paper 2009-01-0110. Detroit, MI. (2009).

Mr. Neale has been invited to speak and lecture about lighting and visibility by a number of organizations and entities including Wayne State University, California State University - Los Angeles, Society of Automotive Engineers (SAE) and Washington State Department of Transportation. Additionally, he has presented at the SAE World Congress in Detroit Michigan on new techniques in visibility and headlamp simulation in 2009, 2010, 2013 and 2016. He is also a member of the Society of Automotive Engineers Roadway Illumination Devices Committee.

**VIDEO AND PHOTOGRAMMETRY BACKGROUND:** Mr. Neale currently teaches "Photogrammetry and Analysis of

Digital Media,” a course sponsored by the SAE. The content of this ACTAR accredited course included photogrammetry, video analysis, video tracking, and digital media analysis. He is not only responsible for the instruction of the course, but also the development of the curriculum.

Mr. Neale has 26 published, peer reviewed technical papers on accident reconstruction, photogrammetry and video analysis, acoustics, and lighting and visibility. He has been invited to lecture on these topics at several institutions including Wayne State University in Detroit, MI, The University of Colorado Department of Engineering in Denver, CO and California State University - Los Angeles, The Art Institute of Colorado and Westwood College. Some of his most recent video and photogrammetry publications include the following:

1. Bailey, Ann; Sherwood, Chris; Funk, James; Crandall, Jeff; **Neale, William**; Carter, Neal, Hessel, David, “Characterization of Concussion Events in Professional American Football using Videogrammetry”, Annals of Biomedical Engineering. ABME-D-20-00847R1. (2020).
2. Bailey, Ann; Funk, James; Lessley, David; Sherwood, Chris; Crandall, Jeff; **Neale, William**; Rose, Nathan, “Validation of a Videogrammetry Technique for Analysing American Football Helmet Kinematics,” Sports Biomechanics (RSPB), Article ID RSPB 1513059; DOI 10.1080/14763141.2018.1513059.
3. **Neale, William T.C.**, Terpstra, Toby, Hashemian, Alireza, “Photogrammetry and Analysis of Digital Media” Published through SAE Technical Course Material, Troy Michigan. (2017).
4. **Neale, William T.C.**, James Marr, David Hessel, “Nighttime Videographic Projection Mapping to Generate Photo-Realistic Simulation Environments.” SAE Paper 2016-01-0415. Detroit, MI. (2016).
5. **Neale, William T.C.**, James Marr, David Hessel, “3D Video Projection Mapping Photogrammetry of Physical Evidence through Video Tracking.” SAE Paper 2013-01-0788B-400. Detroit, MI. (2013).

From 2005-2007, Ford Motor Company funded Mr. Neale’s research related to the development of photogrammetry, video analysis and motion tracking techniques for vehicle rollover crash test analysis. Mr. Neale’s work in simulation, photogrammetry, video tracking and visualization has been central to the ongoing research by the NFL. This research is related to the video analysis of concussion causing events. In 2016, 2017 and 2018, Mr. Neale was invited to present the results from the analysis of live NFL broadcast footage to the Head, Neck, and Spine Injury Committee at the NFL Combine in Indianapolis, Indiana. He continues to utilize his video and photogrammetry methodologies in both his casework and research.

**VISUALIZATION AND SIMULATION BACKGROUND:** Mr. Neale earned both his bachelor’s and master’s degrees in architecture at Washington University. This set the foundation for his background in computer visualization and simulation, and has allowed him to develop physics-based, scientific visualizations admitted by both federal and state courts. These states include Colorado, California, Washington, Florida, Indiana, Nebraska, New York, Arizona, Tennessee and New Jersey.

Mr. Neale’s scientific visualizations have been developed for high-profile incidents and noteworthy events. In 2015, he produced the animations for investigation into the death of Benjamin Cooper, which was featured on TNT’s Cold Justice, episode “Trajectory.” Mr. Neale also produced the animations for the Princess Diana vehicle crash which has been featured on the Discovery Channel’s “Unsolved History: The Death of Diana.” Other animation work has appeared on ABC’s 20/20 and local Denver news channels. He has also worked in association with the Milwaukee Brewers, where he helped develop the funded project, “Speak up to Slow Down.” This campaign teaches teen drivers the principles of distracted driving through the visualization of accident animations that are featured during the Milwaukee Brewers’ games at Miller Park. His work in simulation and visualization has been featured at the William Van Allen Institute in New York, the Pratt Institute in New York City, “Animation World Magazine,” “Visual Illustrator,” and on national television.

Mr. Neale has lead and participated in dozens of research projects related to visualization and simulation, which have been published through the SAE. Some of those publications are as follows:

1. **Neale, William T.C.**, Marr, James P., McKelvey, Nathan A., Kuzel, Michael J., “Nighttime Visibility in Moonlight Conditions.” SAE Paper 2019-01-1005. Detroit, MI. (2019).
2. **Neale, William T.C.**, James Marr, David Hessel, “Nighttime Videographic Projection Mapping to Generate Photo-Realistic Simulation Environments.” SAE Paper 2016-01-0415. Detroit, MI. (2016).
3. Carter, Neal, Alireza Hashemian, Nathan A. Rose, **William T.C. Neale**, “Evaluation of the Accuracy of Image Based Scanning as a Basis for Photogrammetric Reconstruction of Physical Evidence,” SAE Paper 2016-01-1467. Detroit, MI. (2016).
4. **Neale, William T.C.**, James Marr, David Hessel, “3D Video Projection Mapping Photogrammetry of Physical Evidence through Video Tracking.” SAE Paper 2013-01-0788B-400. Detroit, MI. (2013).

For the past 18 years, Mr. Neale has been dedicated to accident reconstruction. His methodologies, research and casework have garnered him the recognition in the areas of forensic engineering and visualization. He continues to dedicate himself to

contributing to research on visualization and accident reconstruction topics, his casework and the accident reconstruction community.

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**PROFESSIONAL AFFILIATIONS:** Society of Forensic Engineers and Scientists (SFES), Society of Automotive Engineers (SAE) – Former Chairman of the Animation Committee in Accident Reconstruction and Member of the Roadway Illumination Devices Committee; National Association of Safety Professionals; Acoustical Society of America Full Member (ASA); IEEE Member of the Computer Society on Visualization; Full Member of IESNA (Illuminating Engineering Society North America).

#### **Funded and Supported Research**

1. “Motorcycle Crash Testing, instrumented side and rear impacts.” IATAI. Springfield, IL. October 7, 2019
2. “Video Analysis of Concussion Causing Events in Professional Football.” Sponsored by the National Football League (NFL). Fall 2015 to present.
3. “Texting and Distracted Driving” Wisconsin State National Campaign Against Distracted Driving. 2015. Funding available through the Milwaukee Brewers et. al.
4. “Speak up to Slow Down” Wisconsin State National Campaign Against Speeding. 2013-2014. Ongoing funding through Score One Production.
5. "Analysis of the vehicle accelerometer data of the **DriveCam** Event Triggered Video System" - DriveCam - The Driver Science Company™
6. “A Method to Quantify Vehicle Dynamics and Deformation for Vehicle Rollover Tests Using Camera-Matching Video Analysis,” funded in part by **Ford Motor Company**, 2007.
7. “Image Analysis of Rollover Crash Test Using Photogrammetry,” funded in part by **Ford Motor Company**, 2005-2006.

#### **Books**

1. Rose, N., **Neale, W.**, “Motorcycle Accident Reconstruction”, December, 2018, published through Society of Automotive Engineers, Troy Michigan.

#### **Peer Reviewed Scientific Publications**

1. Bailey, Ann; Sherwood, Chris; Funk, James; Crandall, Jeff; **Neale, William**; Carter, Neal, Hessel, David, “Characterization of Concussion Events in Professional American Football using Videogrammetry”, Annals of Biomedical Engineering. ABME-D-20-00847R1. (2020).
2. **Neale, W.**, Terpstra, T., “Empirical Evaluation of in-field, binaural record and playback reproduction.” *The Journal of the Acoustical Society of America* Volume 145, No.3, Pt. 2, March 2019: 4pAA12.
3. Danaher, D., **Neale, W.**, McDonough, S., and Donaldson, D., “Low Speed Override of Passenger Vehicles with Heavy Trucks,” SAE Technical Paper, 2019-01-0430, 2019, doi:10.4271/2019-01-0430.

4. Terpstra, T., Beier, S., **Neale, W.**, "The Application of Augmented Reality to Reverse Camera Projection," SAE Technical Paper, 2019-01-0424, 2019, doi:10.4271/2019-01-0424
5. N., Carter, N., **Neale, W.**, McKelvey, N., "Braking and Swerving Capabilities of Three-wheeled Motorcycles" SAE Technical Paper, 2019-01-0413, 2019, doi:10.4271/2019-01-0413
6. **Neale, W.**, Marr, J., McKelvey, N., Kuzel, J., "Nighttime Visibility in Moonlight Conditions." SAE Technical Paper 2019-01-1005, 2019, doi:10.4271/2019-01-0141
7. Bailey, A., Funk, J., Lessley, D., Sherwood, C., Crandall, J., **Neale, W.**, Rose, N., "Validation of a Videogrammetry Technique for Analysing American Football Helmet Kinematics," Sports Biomechanics (RSPB), Article ID RSPB 1513059; doi: 10.1080/14763141.2018.1513059.
8. **Neale, W.**, McKelvey, N., Pentecost, D., Koch, D., "Motorcycle Headlamp Distribution Comparison" SAE Technical Paper 2018-01-0112, 2018, doi:10.4271/2018-01-0112
9. I.DRR 2018, Interactive Driver Response Research by Crash Solutions (Muttart, J. East Hampton, CT: Crash Safety Solutions, LLC), Contributor author **Neale, W.**, to the motorcycle headlamp beam patterns in the section "Headlamp Analysis".
10. McDonough, S., Danaher D., **Neale, W.**, "Mid-Range Data Acquisition Units Using GPS and Accelerometers" SAE Technical Paper 2018-01-0513, 2018, doi:10.4271/2018-01-0513
11. **Neale, W.**, Terpstra, T., Hashemian, A., "Photogrammetry and Analysis of Digital Media" Published through SAE Technical Course Material, Troy Michigan. (2017).
12. Bortles, W., David H., **Neale, W.**, "Application of 3D Visualization in Modeling Wheel Stud Contact Patterns with Rotating and Stationary Surfaces." SAE Technical Paper, 2017-01-1414, 2017, doi:10.4271/2017-01-1414
13. **Neale, W.**, Marr, J., Hessel, D., "Nighttime Videographic Projection Mapping to Generate Photo-Realistic Simulation Environments." SAE Technical Paper, 2016-01-0415, 2016, doi:10.4271/2016-01-0415
14. **Neale, W.**, Hessel, D., Koch, D., "Determining Position and Speed through Pixel Tracking and 2D Coordinate Transformation in a 3D Environment." SAE Technical Paper, 2016-010-1478, 2016, doi:10.4271/2016-010-1478
15. **Neale, W.**, Danaher, D., McDonough, S., Owens, T., "Data Acquisition using Smart Phone Applications." SAE Technical Paper, 2016-01-1461, 2016, doi:10.4271/2016-01-1461
16. Rose, N., Carter, N., Kreisher, J., Randolph, M., **Neale, W.**, Danaher, D., "How Accurate Are Witness Distance Estimates Given in Car Lengths?" Collision: The International Compendium for Crash Research, Volume 11, Issue 1, 2016.
17. Carter, N., Hashemian, A., Rose, N., **Neale, W.**, "Evaluation of the Accuracy of Image Based Scanning as a Basis for Photogrammetric Reconstruction of Physical Evidence," SAE Technical Paper 2016-01-1467, 2016, doi:10.4271/2016-01-1467
18. Bortles, W., **Neale, W.**, "The Misunderstood Witness - Event Data Recorders for Heavy Vehicles." American Bar Association - Tort Trial & Insurance Practice Section, Automobile Law Committee News, Spring 2013.
19. **Neale, W.**, Marr, J., Hessel, D., "3D Video Projection Mapping Photogrammetry of Physical Evidence through Video Tracking." SAE Technical Paper 2013-01-0788B-400, 2013, doi:10.4271/2013-01-0788B-400
20. Bortles, W., **Neale, W.**, "Automotive Event Data Recorders: Ushering in a New Era of Accident Reconstruction." American Bar Association - Tort Trial & Insurance Practice Section, Automobile Law Committee News, Summer 2012.
21. Rose, N., **Neale, W.**, Carter, N., "Using Data from a DriveCam Video Event Recorder to Reconstruct a Hard-Braking Event." *Collision Magazine*. Spring 2012
22. **Neale, W.**, Hessel, D., Terpstra, T., "Photogrammetric Measurement Error Associated with Lens Distortion." SAE Technical Paper, 2011-01-028611B-0043, 2011, doi:10.4271/2011-01-028611B-0043
23. **Neale, W.**, Hessel, D., Marr, J., "Evaluation of Photometric Data Files for Use in Headlamp Light Distribution." SAE Technical Paper, 2010-01-0292, 2010, doi:10.4271/2010-01-0292
24. **Neale, W.**, Terpstra, T., "Comparison of Sound Pressure Levels of Mid-to-Large Size On-Road Motorcycles Through Volume Modeling." *The Journal of the Acoustical Society of America* 126:4 (Oct. 2009): 5aNS7.

25. **Neale, W.**, Hessel, D., “Simulating Headlamp Illumination Using Photometric Light Clusters.” SAE Technical Paper, 2009-01-0110, 2009, doi:10.4271/2009-01-0110
26. **Neale, W.**, Terpstra, T., Bortles, W., “Evaluation of Discrete Vehicle Accident Sounds for use in Accident Reconstruction.” *Proceedings of Meetings on Acoustics* Vol.5 (2008).
27. **Neale, W.**, Terpstra, T., Bortles, W., “Analysis of Commonly Witnessed Vehicle Accident Sounds *in situ*.” *The Journal of the Acoustical Society of America* 124:4 (Oct. 2008): 5aNS5.
28. Rose, N., **Neale, W.**, Fenton, S., Hessel, D., McCoy, R., Chou, C., “A Method to Quantify Vehicle Dynamics and Deformation for Vehicle Rollover Tests Using Camera-Matching Video Analysis.” SAE Technical Paper, 2008-01-0350, 2008, doi:10.4271/2008-01-0350
29. **Neale, W.**, Terpstra, T., “Methodology for Physics-Based Sound Composition in Forensic Visualization.” *Proceedings of Meetings on Acoustics* Vol.1 (2007).
30. **Neale, W.**, Terpstra, T., “Methodology for Reconstruction of Vehicle Accident Acoustics for use in Forensic Visualization.” *The Journal of the Acoustical Society of America* 121:5 (May 2007): 3pAA8.
31. Chou, C., McCoy, R., Fenton, S., **Neale, W.**, Rose, N., “Image Analysis of Rollover Crash Test Using Photogrammetry.” SAE Technical Paper, 2006-01-0723, 2006, doi:10.4271/2006-01-0723
32. **Neale, W.**, Fenton, S., McFadden, S., Rose, N., “A Video Tracking Photogrammetry Technique to Survey Roadways for Accident Reconstruction.” SAE Technical Paper, 2004-01-1221, 2004, doi:10.4271/2004-01-1221
33. Fenton, S., **Neale, W.**, Rose, N., Hughes, C., “Determining Crash Data Using Camera-Matching Photogrammetric Technique.” SAE Technical Paper, 2001-01-3313, 2001, doi:10.4271/2001-01-3313

#### **Other Articles**

1. **Neale, W.**, “Putting the Jury in the Driver's Seat”, DriveCam Online News and Events – Legal Section, January, 2012.
2. **Neale, W.**, “Photogrammetry Techniques in Accident Reconstruction”, DriveCam Online News and Events – Legal Section, September 2011.
3. **Neale, W.**, “The Power of Physical Evidence in Accident Reconstruction”, DriveCam Online News and Events – Legal Section, August 2011.
4. **Neale, W.**, Undergraduate Curriculum for Forensic Animation for the Art Institute of Colorado. (2004)
5. **Neale, W.**, “Computer Visualization Section,” contributed content. *Illustreret Videnskab (Visual Illustrator)* 2:2003 (Feb. 2003).
6. **Neale, W.**, Contributed Content. *Animation World Magazine* (Jan. 2002).

#### **Invited Lectures**

1. “Nighttime Visibility in Motorcycle Crashes,” Speaker at IATAI Conference. October 6-9, 2019.
2. “Empirical Evaluation of in-field, binaural record and playback reproduction.” Acoustical Society of America, 177<sup>th</sup> Meeting, Louisville, Kentucky, May, 2019.
3. “Low Speed Override of Passenger Vehicles with Heavy Trucks” Technical Paper Presentation 2019-01-0430, Society of Automotive Engineers World Congress Experience, Detroit MI, April 2019.
4. “The Application of Augmented Reality to Reverse Camera Projection” Technical Paper Presentation 2019-01-0424, Society of Automotive Engineers World Congress Experience, Detroit MI, April 2019.
5. “Nighttime Visibility in Moonlight Conditions” Technical Paper Presentation 2019-01-1005, Society of Automotive Engineers World Congress Experience, Detroit MI, April 2019.
6. “On Field and Laboratory Video Reconstruction” NFL Engineering Committee Meeting, Indianapolis, Indiana. February 28, 2018.

7. "Photogrammetry and Analysis of Digital Media" 3 day ACTAR accredited course through the Society of Automotive Engineers, SAE International, Troy Michigan. December 13-15, 2017, June 27-29, 2018.
8. "Motorcycle Headlamp Distribution Comparison" Technical Paper Presentation 2018-01-0112, Society of Automotive Engineers World Congress Experience, Detroit MI, April 2018.
9. "Application of 3D Visualization in Modeling Wheel Stud Contact Patterns with Rotating and Stationary Surfaces," Technical Paper Number 2017-01-1414, Society of Automotive Engineers World Congress Experience, Detroit, MI, April 4, 2017.
10. "Video Reconstruction and Validation" NFL Head Neck and Spine Engineering Subcommittee, NFL Scouting Combine, Indianapolis, Indiana March 1, 2017.
11. "Nighttime Videographic Projection Mapping to Generate Photo-Realistic Simulation Environments." Human Factors in Driver Vision and Lighting, Society of Automotive Engineers 2016 World Congress. Detroit, MI. April 13, 2016.
12. "Data Acquisition Using Smart Phone Applications." Occupant Protection: Accident Reconstruction, Society of Automotive Engineers 2016 World Congress. Detroit, MI. April 13, 2016.
13. "Determining Position and Speed through Pixel Tracking and 2D Coordinate Transformation in a 3D Environment." Occupant Protection: Accident Reconstruction, Society of Automotive Engineers 2016 World Congress. Detroit, MI. April 13, 2016.
14. "Evaluation of the Accuracy of Image Based Scanning as a Basis for Photogrammetric Reconstruction of Physical Evidence." Occupant Protection: Accident Reconstruction, Society of Automotive Engineers 2016 World Congress. Detroit, MI. April 13, 2016.
15. "Video Analysis of Concussion Causing Events in Professional Football." NFL Head Neck and Spine Engineering Subcommittee, NFL Scouting Combine, Indianapolis, Indiana February 24, 2016.
16. "Nighttime Visibility Issues in Forensics." California State University, Los Angeles, CA. November 10, 2015.
17. "Liability Issues in Motorcycle Training and Instruction." T3RG Annual Meeting, Fay Meyers Motorcycle World. February 9, 2014.
18. "Revealing the Facts through Photogrammetric Analysis." Washington Defense Trial Lawyers, Seattle, WA. December 6, 2013.
19. "3D Video Projection Mapping Photogrammetry of Physical Evidence through Video Tracking." SAE Technical Paper Presentation, SAE World Congress. 2013.
20. "Demonstratives in Court." DRI 2012 Product Liability Conference, Las Vegas, NV. 2012.
21. "Computer Visualization in Daytime and Nighttime Visibility" Sentry Headquarters, Stevens Point, WI. Feb. 28 and 29, 2012.
22. "Perception, Reaction and Visualization in Motorcycle Operation." Society of Forensic Engineers & Scientists, Kauai, HI. Jan. 2012.
23. "Motorcycle Safety Training Effectiveness." Society of Forensic Engineers & Scientists, Nevada City, CA. July 2011.
24. "Computer Visualization in Accident and Injury Analysis." Wayne State University, Detroit, MI. April 2011.
25. "Photogrammetric Measurement Error Associated with Lens Distortion." Society of Automotive Engineers, Detroit, MI. 2011.
26. "Psychophysically Validated 3D Mapping in Computer Generated Visualization." Society of Forensic Engineers and Scientists, Berkeley, CA. Feb. 2011.
27. "Computer Visualization in the Courtroom." Williams Montgomery & John, Ltd., Chicago, IL. July 2010.
28. "Accident Reconstruction and Visualization." Wayne State University, School of Bioengineering, Detroit, MI. April 2010.
29. "Evaluation of Photometric Data Files for Use in Headlamp Light Distribution." SAE World Congress, Detroit, MI. 2010.
30. "Visualization and Visibility in Accident Reconstruction." Washington State Department of Transportation. Oct. 2009.
31. University of Colorado at Denver. Guest Lecturer in Accident Reconstruction. July 2009.

32. "Art Institute Portfolio Review." Graduating Class, Convention Center, Denver, CO. June 2009.
33. "Simulating Headlamp Illumination Using Photometric Light Clusters." SAE World Congress, Detroit, MI. 2009.
34. "Topics in Noise – Active Noise, Product Noise, and Community Noise." Acoustical Society of America 156<sup>th</sup> Annual Conference, Miami, FL. 2008.
35. "A Method to Qualify Vehicle Dynamics and Deformation for Vehicle Rollover Tests Using Camera-Matching Video Analysis." SAE Technical Paper Presentation, SAE World Congress. 2008.
36. "Use of Animation in Automotive Product Liability Cases." DRI 2008 Product Liability Conference, Phoenix, AZ. 2008.
37. "Topics in Architectural Acoustics: Acoustics in Rooms, Ducts, and Forensics." Acoustical Society of America 153<sup>rd</sup> Annual Conference, Salt Lake City, UT. 2007.
38. "The Art of Forensic Visualization." Art Institute of Colorado, Media Arts and Animation Dept., Denver, CO. 2003.
39. "Computer Modeling and Animation in Litigation." Presenter, Gorsuch and Kirgis, Denver, CO. 2002.
40. Art Institute Portfolio Review, Graduating Class, Convention Center, Denver, CO. June 2002.

### **Technical Training, Classes and Conferences**

1. "MSF Quality Assurance Specialist Certification Course." Golden, CO. February 29 - March 1, 2020.
2. "Nighttime Visibility in Motorcycle Crashes," Traffic Crash Reconstruction Conference. 33<sup>rd</sup> IATAI Annual. Springfield, IL. October 6-9, 2019.
3. EDR Summit. Houston, TX. March 4-6, 2019.
4. "Advanced Crash Reconstruction Utilizing Human Factors Research," Class-40 hours. Northwestern University Center for Public Safety. Evanston IL. May 15-19, 2017.
5. "NFL Head, Neck and Spine Engineering Subcommittee Meeting" NFL Scouting Combine, Indianapolis Indiana, February 2017.
6. "Vehicle Crash Reconstruction Methods," Class-20 hours. Society of Automotive Engineers. Scottsdale, AZ. September 28-30, 2016.
7. "NFL Head, Neck and Spine Engineering Subcommittee Meeting" NFL Scouting Combine, Indianapolis Indiana, March 2016.
8. "Human Factors in Driver Vision and Lighting" and "Occupant Protection: Accident Reconstruction" seminars – 10hrs. SAE World Congress. Detroit, MI. April 2016.
9. "Online Training Course." PC-Crash. November 2015.
10. "Photography and Light." IESRMS. Denver, CO. January 2015.
11. "Human Factors in Driver Vision and Lighting" and "Occupant Protection: Accident Reconstruction" seminars – 10hrs. SAE World Congress. Detroit, MI. April 2013.
12. Motorcycle Crash Reconstruction Class-40 hrs - Northwestern University Center for Public Safety. September, 2012.
13. Traffic Crash Reconstruction II Class-40 hrs - Northwestern University Center for Public Safety. May 2012.
14. Traffic Crash Reconstruction I Class-80 hrs - Northwestern University Center for Public Safety. October 2011.
15. "Animal Crashes Implications for Headlights." University of Michigan Transportation Research Institute. April 2010.
16. "Automotive Lighting: Design and Technology." Class-10 hrs SAE World Congress. Detroit, MI. April 2009.
17. "Computer Aided Exterior Lighting Design." Class-10 hrs Illuminating Engineering Society of North America. Oct. 2008.



18. "Automotive Lighting: LED Applications." Class-10 hrs -SAE International. April 2008.
19. "VBox Product Training." VBOX USA. April 2008.
20. Human Factors Course. Class – 40 hrs - University of Michigan College of Engineering. July 2008.
21. Fitzhorn, Patrick. "Tire Mechanics & Modeling." Colorado State University. March 2008.
22. Vehicle Dynamics Course. Class-40 hrs - Northwestern University Center for Public Safety. April 2007.
23. "Architectural Acoustics: Acoustics in Rooms, Ducts and Forensics." Acoustical Society of America 153<sup>rd</sup> Annual Conference, Salt Lake City, UT. 2007.
24. "Accident Investigation." National Association of Safety Professionals. Nov. 2005.
25. "Computer Simulation Realism in Animation and Dynamic Motion." SIGGRAPH, Los Angeles, CA. 2004.
26. "Computer Simulation and Dynamic Motion." SIGGRAPH, San Diego, CA. 2003.
27. Field Investigation and Inspection Surveying. New York, NY. 1997.

### **Motorcycle Testing and Training**

1. **2018 BMW R1200 GS.** Acceleration, braking and swerving testing. Centennial, Colorado. September 29, 2018.
2. **2018 Harley Davidson TriGlide-Ultra.** Acceleration, braking and swerving testing, V-box data collection. Foxborough, Colorado. September 6, 2018.
3. **2001 Suzuki SV650S.** (kcorp.3554) Handling and stability, V-box data collection. Los Angeles California, August 30, 2018.
4. **2011 Road Glide Ultra FLTRU.** (kcorp.3453) Deceleration testing and using Harry's Laptimer. Foxborough, Colorado. June 12, 2018.
5. **2017 Harley Davidson Roadking FLHR.** (kcorp.2876) Handling, stability, and braking with a passenger, V-box and Video. January 17, 2018.
6. **2001 Suzuki SV650S.** (kcorp.3076) Handling, stability, cornering, and nighttime visibility. Los Angeles California, October 11, 2017.
7. **2007 Suzuki GSXR-750.** (kcorp.3063) Cornering, leaning braking, and acceleration testing, V-box data collection. Los Angeles, CA. August, 2017.
8. **2015 Harley Davidson FLSTC.** (kcorp.3036) Nighttime Visibility Testing. Longview, WA. May 29, 2017.
9. **2009 Can-Am Spyder.** Braking, swerving and cornering testing. Denver, CO. April 22, 2017.
10. **2016 Harley Davidson Tri-Glide-Ultra Classic.** Braking, swerving and cornering testing. Denver, CO. April 22, 2017.
11. **2016 Harley Davidson Free Wheeler.** Braking, swerving and cornering testing. Denver, CO. April 22, 2017.
12. **2005 Yamaha YZF-R1.** (kcorp.2976) Nighttime Visibility Testing. Gilbert, AZ. January 16, 2017.
13. **2003 Harley Davidson Roadking.** (kcorp.2513) Handling and stability testing. Lakewood, CO. May 3, 2016.
14. **2002 Honda VTX 1800S.** (kcorp.2532) Handling and stability testing with under inflated, and properly inflated tires. Denver, CO. March 14, 2016.
15. **2006 Honda CBR600RR.** (kcorp.2461) Acceleration, deceleration and visibility testing. Santa Fe, NM. January 28, 2016.
16. **2009 Kawasaki EX650.** (kcorp.2134) Acceleration, stability and handling testing. Washington, DC. November 20, 2015.
17. **2003 Suzuki GSX R600.** (kcorp.2525) Idle and acceleration testing. Lakewood, CO. September 15, 2015.
18. **BMW R1200.** Handling and stability testing. Portland, OR. May 26-28, 2015.

19. **2009 Kawasaki ZX1000.** Acceleration, deceleration and visibility testing. Tampa, FL. March 23, 2015.
20. **2008 Harley Davidson FXDL.** Acceleration, deceleration and visibility testing. Tampa, FL. March 23, 2015.
21. **2009 Kawasaki KL650.** Acceleration, deceleration and visibility testing. Tampa, FL. March 23, 2015.
22. **2005 Suzuki SV650.** (kcorp.2250) Passenger Stability and cornering testing. V-box data collection. Spokane Washington. May 6, 2014.
23. **2006 Triumph Bonneville.** Passenger Stability and cornering testing. Greenwood Village CO. April 23, 2014
24. **2003 Harley Davidson FXD Superglide.** Lean Angle and Compression Test. Frederick, CO. October 24, 2013.
25. **Harley Davidson Road Bike.** 50 mph crash test. Victorville, CA. August 7-8, 2013.
26. **2004 Harley Davidson FXD.** (kcorp.1948) Mountain road handling and stability. Video data collection, White Pass, Washington, December 2013.
27. **Motorcycle Crash Reconstruction.** Northwestern University. Evanston, IL. September 2012
28. **1984 Honda VF 500 V30 Magna.** (kcorp.1695) Stability and cornering. Video data collection. Spokane Washington. May 6, 2014.
29. **Level I Motorcycle Accident Scene Management.** The Center for Transportation Safety. Commerce City, CO. January 2011.
30. **Level II Advanced Motorcycle Accident Scene Management.** The Center for Transportation Safety. Commerce City, CO. March 2011.
31. **2011Suzuki GSXR-750.** (kcorp.1981) Braking and acceleration testing and V-box data collection. Colorado Springs, CO. November 2012.
32. **1996 Honda Shadow Sabre American Classic Edition.** Braking and acceleration testing and V-box data collection. Longmont, CO. September 2012.
33. **2000 Yamaha V-Star XVS-1100** Cruising Bike. Handling and cornering. Seattle, WA. February 2012.
34. **2006 Honda CBR 1000RR** Racing Bike. Deceleration Testing and V-box Data Collection. Denver, CO. October 2011.
35. **2006 Honda CBR 1000RR** Racing Bike. Daytime Visibility Testing. Tracy, CA. September 2011.
36. **2006 Honda CBR 1000RR** (kcorp.1657) Racing Bike. Nighttime Visibility Testing. Aurora Airstrip. Denver, CO. June 2011.
37. **2006 Honda CBR 1000RR** (kcorp.1657) Racing Bike. Highway Handling Testing. Ontario, CA. June 2011.
38. **2006 Harley Davidson FXST** (Softail). Nighttime Visibility Headlamp Testing. Oroville, CA. June 2011.
39. **1993 Harley Davidson Fatboy.** Daytime Visibility and Handling. Horton, AL. January 2010.
40. **MSF Rider Coach Training Program.** May 2010.
41. **2007 Kawasaki ZX600.** Daytime Visibility and Handling Testing. Tulsa, OK. March 16, 2010.
42. **2006 Suzuki SV650.** Deceleration and Engine Brake Testing and Vbox Data Collection. Centennial, CO. September 2009.
43. **2006 Yamaha YZFR1.** Deceleration and Engine Brake Testing and Vbox Data Collection. Arvada, CO. June 2009.
44. **2007 Triumph Americana.** Vehicle Noise Testing. Denver, CO. Summer 2009.
45. **Total Control Advanced Rider's Course.** T3RG Motorcycle School. Aurora, CO. June 2009.
46. **2007 Honda CBR 1000** (kcorp.1399) Sport Bike. Daytime Visibility Testing. Video data collection. Santa Barbara, CA. June 8-9 2009.

47. **2007 Honda CBR 1000** (kcorp.1399) Sport Bike. Deceleration Testing, Video data collection Denver, CO July 2009.
48. **1998 Yamaha VMax** (kcorp.1194) Headlamps. Nighttime Visibility Testing. California Department of Transportation. Monterey, CA. August 2008.
49. **2006 Triumph Bonneville**. Transient Braking on Different Friction Surfaces and VC3000 Data Collector. Bandimere Speedway. Morrison, CO. October 2007.
50. **2004 Harley Davidson "Fat Boy"**. (kcorp.1212) Locked Rear Wheel Braking Distance and VC3000 Data Collector. Hesperia, CA. October 2007.
51. **2004 Harley Davidson "Fat Boy"**. (kcorp.1212) Braking and Deceleration and VC3000 Data Collector. Motorcycles. Denver, CO. September 2007.
52. **Harley-Davidson's Rider's Edge Rider Course**. Motorcycle Safety Foundation, Harley Davidson Academy of Motorcycling. Littleton, CO. May 2007.