

**OBJECTIVE:**

The application of professional experience with tutorial and academic preparation allowing for professional growth and recognition.

**PROFESSIONAL EXPERIENCE:**

- **Accredited Traffic Accident Reconstructionist**, ACTAR #3279, The Accreditation Commission for Traffic Accident Reconstruction, certificate issued August 29, 2017.
- **The Crash Lab, Inc., Hampton, New Hampshire, April 2019 to present**  
Accredited Traffic Accident Reconstructionist, providing services to insurance companies, law firms and governmental agencies that require motor vehicle accident reconstruction for use in civil and criminal litigation. Duties include, but are not limited to, field investigations; vehicle damage analysis, low velocity impact analysis, occupant kinematics, photography, velocity calculations, time and distance analysis, lamp filament examination, Forensic Scene Mapping, Crash Data Retrieval (CDR) imaging and data analysis report preparation, expert testimony and seminar presentations. Certified Crash Data Retrieval (CDR) Analyst.
- **Vermont State Police, 1990 to 2019**  
**Corporal, Accredited Traffic Accident Reconstructionist Emergency Services Unit**  
Assisted in the creation and formation of the Vermont State Police Crash Reconstruction Team (VSP CRT) in 2008. Reviewed reconstruction reports for all members of the VSP CRT. Organized and conducted bi-monthly training for all members of the VSP CRT. Developed and authored Request for Proposals for ongoing development of the VSP CRT to include electronic measurement tools, several generations of diagramming software, and unmanned aviation program. Crash Investigation Instructor for the Vermont Criminal Justice Training Council.

Areas of Expertise: Roadway Evidence Identification and Interpretation; Drag Factor Determination (Coefficient of Friction); Tire and Lamp Examination; Vehicle Damage Analysis; Vehicle Dynamics; Vehicle Rollovers; Pedestrian and Bicycle Collision Dynamics; Speed Determination: Slide to Stop (Skid), Yaw/Critical Curve Speed, Vault/Fall/Flip, Pedestrian, Conservation of Linear Momentum; Forensic Mapping and Scene Diagramming – Sokkia/TopCon Total Station/mFx Data Recorder Software and Visual Statement/ARAS360/FaroHD/Virtual Crash 4 CAD Diagramming; Virtual Crash 4 Animations and Physics-Based Simulations; and Bosch/Vetronix Crash Data Retrieval System – Event Data Recorder Systems on Motor Vehicles.

- Recognized Expert to give testimony before States' Courts.
- Preparation of Collision Reconstruction for Counsel in Civil and Criminal Litigation.
- FAA Licensed Remote Pilot, license issued January 2018, valid through April 2025.

**INSTRUCTOR:**

**Co-Instructor, Heavy Vehicle Truck Forensic Mechanical Inspection for Collision Investigators**, Northwestern University, Center for Analytics and Research in Transportation, Baton Rouge, Louisiana, March 4-8, 2024. Topics included: Heavy Vehicle Nomenclature; Braking Systems; Suspension Systems; Wheel Systems; Steering Systems; Proper Forensic Investigation Methods; Hands-on Experience with Collision-Damaged Trucks; and Restoration of Damaged Air Brake Systems on Commercial Vehicles to Allow Data Collection.

**Presenter, Using Recon 3D to Map Surveillance Camera Locations**, Recon-3D User Group Meeting, February 20, 2024.

**Presenter, Remote Viewing with A-Power Mirror**, Recon-3D Online User Group Meeting, March 21, 2023.

**Co-Instructor, UAV Manual Flight/Pix4D/Cloud Compare/Pix4D to Map360 Training**, The Crash Lab, Inc., Saco, Maine for local Maine Law Enforcement Officers, March 2-3, 2021. Topics included: Fundamentals of Manual Flight; Processing UAV Captured Images in Pix4D Software; Clean Up of the Point Cloud and Orthomosaic Using Pix4D and Cloud Compare; Importing Data into Leica Map360 Diagramming Software; Flying a Mock Scene; Use of the Pix4D Capture App; Flying "Orbits" to Create a 3D Point Cloud Model of a Vehicle; and Hands-on Processing of Imagery in Pix4D.

**VSP CRT In-Service Training**, November 16, 2018, 6 hours, VSP Royalton Barracks, Royalton, Vermont. Topics included: Using Microsoft Excel in Traffic Crash Reconstruction Review.

**Crash Investigation Basic**, October 18-19, 2018, 16 hours, Vermont Police Academy, Pittsford, Vermont. Topics included: Identifying and Documenting Vehicle Evidence.

**VSP CRT In-Service Training**, July 17, 2018, 6 hours, VSP Royalton Barracks, Royalton, Vermont. Topics included: Interactive Driver Response Research Overview; and Collinear Event Data Recorder Review.

**At Scene Traffic Crash Investigation**, May 7-18, 2018, 80 hours, Vermont Police Academy, Pittsford, Vermont. Topics included: Series of Events; Time-Distance; Math Review; Coefficient of Friction; Grade/Superelevation; Braking Efficiency; Slide-to-Stop; Identifying Yaw Marks; Determining Radius; Speed from Yaw; Combined Speed; Airborne (Fall/Flip); Vehicle Evidence; Roadway Evidence; Photography; and Scale Diagramming.

**Crash Investigation Basic**, March 26, 2018, 6 hours, Vermont Police Academy, Pittsford, Vermont. Topics included: Scene Evidence.

**VSP CRT In-Service Training**, March 20, 2018, 6 hours, VSP Royalton Barracks, Royalton, Vermont. Topics included: Using Microsoft Excel; Monte Carlo Analysis; and Momentum Review.

***VSP CRT In-Service Training***, January 16, 2018, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Using Microsoft Excel in Traffic Crash Reconstruction.

***VSP CRT In-Service Training***, November 21, 2017, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Vector Sum Analysis.

***VSP CRT In-Service Training***, July 17, 2017, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Time-Distance Review.

***At Scene Traffic Crash Investigation***, May 8-19, 2017, 80 hours, Vermont Police Academy, Pittsford, Vermont. Topics included: Series of Events; Time-Distance; Math Review; Coefficient of Friction; Grade/Superelevation; Braking Efficiency; Slide-to-Stop; Identifying Yaw Marks; Determining Radius; Speed from Yaw; Combined Speed; Airborne (Fall/Flip); Vehicle Evidence; Roadway Evidence; Photography; and Scale Diagramming.

***VSP CRT In-Service Training***, March 21, 2017, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Scale Diagramming Review; and Momentum Review.

***VSP CRT In-Service Training***, January 17, 2017, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Reference Measurement Protocol; Using Spreadsheets in Reconstruction; Using EDR Data in Reconstruction; and Vehicle Undercarriage Damage.

***VSP CRT In-Service Training***, September 20, 2016, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Forensic Mapping Field Exercise.

***VSP CRT In-Service Training***, November 17, 2015, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Spin Analysis.

***VSP CRT In-Service Training***, November 17, 2014, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Use of PowerPoint in Court; Video Analysis; and Presentation of Topics Learned at 2014 Pennsylvania State Police Reconstruction Conference.

***VSP CRT In-Service Training***, May 20, 2014, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Forensic Mapping Field Exercise @ I89 Exit 3; and Diagramming.

***VSP CRT In-Service Training***, November 13, 2013, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Introduction to Canon PowerShot Camera; Friction Review; and Critical Speed Yaw Review.

***VSP CRT In-Service Training***, January 15, 2013, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Data Collector Review; Case Review; and Report Standardization.

***VSP CRT In-Service Training***, November 20, 2012, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Forensic Mapping with Total Station Review.

***VSP CRT In-Service Training***, May 17, 2011, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Motorcycle Crash Investigation Review; Case Review; and Officer Involved Shooting Case Review.

***VSP CRT In-Service Training***, November 16, 2010, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Visual Statement Diagramming; and Case Review.

***VSP CRT In-Service Training***, July 20, 2010, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Case Review; Use of Google Earth in Diagramming; Time-Distance Review; and Momentum Review.

***VSP CRT In-Service Training***, April 27, 2009, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Use of Total Station; and Visual Statement Diagramming.

***VSP CRT In-Service Training***, January 26, 2009, 6 hours, VSP Royalton Barracks, Royalton, Vermont, Topics included: Use of Total Station; and Visual Statement Diagramming.

## **EDUCATION:**

### **National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Toyota Safety Systems – Nick Manz***

**June 14, 2024 – Via Zoom**

Attended a two hour webinar on the history and technology of the various Advanced Driver Assistance Systems (ADAS) that Toyota vehicles have been built with since 2015. Overview of systems designed to prevent or mitigate frontal collisions, reduce the occurrence of lane departures, improve nighttime driving safety, and protect pedestrians and how this technology relates to crash analysis.

### **SAE International**

***Accessing and Interpreting Heavy Vehicle Event Data Recorders***

**June 4-7, 2024, Appleton, Wisconsin**

Successfully completed a three-and-one-half day course of instruction. Topics Included: Identifying the potential sources of HVEDR data available on Commercial Vehicles; Utilizing various methodologies for accessing and imaging data from HVEDRs while preserving the data in its original electronic format within the control module; Compiling documentation of the vehicle and the imaged HVEDR data to properly establish foundational facts that tie the data to the vehicle and to ensure the reliability of incident specific data; Proper interpretation of data from HVEDRs and understanding the limitations of the data; and Analyzing HVEDR data in the context of collision reconstruction.

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**FAA Aviation Safety – *FAAS*Team Safer Skies through Education**  
***Pro Tips for UAS-Airspace Requirements LAANC and B4UFLy***  
**April 24, 2024 (via Zoom)**

Attended a 1.25 hour webinar. Topics Included: Refresher on the different classes of Airspace and how to identify; Review the rules to legally fly drones in the National Airspace System (NAS); How to obtain an authorization to fly in airspace where it is required; and show some of the updates to the FAA's free B4UFLy app.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**  
***2004 Symposium on EDR Research and Training***  
**April 8-12, 2024, Oklahoma City, Oklahoma**

Attended a five day conference. Topics Included: CDR-Bosch - What's New?; Toyota GTS and Techstream; 2023 Toyota Safety Sense Applicability Chart; Lexus Safety Systems Listing; EDR Case Study; Accuracy of EDRs in late model vehicles; 2024 SAE EDR paper preview; EDR Analyst Equations; Need for Pre-Crash Acceleration Data in EDR for Vulnerable Road User (VRU) collisions; GM Vehicle Systems and their EDRs; GM ASCM-FCM Case Studies; CDR Backpowering/Repowering Update; Berla Vehicle System Forensics; Motorcyclist Airbag PPE; Motorcycle EDR Data Analysis and Update; New and Evolving HV EDRs; HV EDR Issues; Vehicle Speed Sensors and HV EDRs; Analysis of HV EDR Data; HV EDR Data Discussion using Paccar, Bendix, WABCO, Detroit Diesel, Eaton Transmission, ELD; and Diagnosing Mechanical Issues.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**  
***Advanced Collision Reconstruction with CDR Applications – Greg Russell***  
**March 18-22, 2024, Manchester, New Hampshire**

Attended a five-day conference. Topics included: Overview of Pre-Crash and Crash-Pulse Data; Calculating delta-V from Acceleration Data; Calculating Impulse delta-V from x/y delta-V Data; Calculating PDOF from x/y delta-V Data; Adjusting x Axis delta-V to Represent Impulse delta-V; Single Equation Approach to 360° Momentum Analysis; Calculating Impact & Post Impact Velocities from CDR Data (delta-V and PDOF); Reconciling Pre-Crash and Post-Crash CDR Data; and Analyzing CDR Data in the Context of Your Reconstruction.

**Bendix**  
***On-Line Brake School***  
**February 26, 2024**

Successfully completed the online air brake training program in the operation and maintenance of heavy duty vehicle air brake systems.

### **Recon-3D**

#### ***User Group Meeting***

**February 20, 2024**

Attended a five-hour webinar. Topics included: Recon 3D Updates and Use of App; Using Recon 3D to Map Surveillance Camera Locations; Documenting Bullet Trajectories; Vehicle Scanning for Traffic Accident Reconstruction; and Challenges with Scanning Roadways.

### **National Association of Professional Accident Reconstruction Specialists (NAPARS)**

#### ***Determining Vehicle Speed from an Audio Recording - Alan Moore***

**February 16, 2024 – Via Zoom**

Attended a two hour webinar. Topics included Basics of Extracting Frequency Information from Vehicle Noise; How Engine Frequency is Related to Vehicle Speed; How to Handle Torque Converter Slip; Advantages and Limitations of the Method; and How to Apply the Method in Practical Examples.

### **National Association of Professional Accident Reconstruction Specialists (NAPARS)**

#### ***Nighttime Crash Scene Investigation - Jeffrey W. Muttart, Ph.D., Driver Research Institute, LLC***

**January 4, 2024, Hampton, Connecticut – Via Zoom**

Attended a two-hour webinar. Topics included: Understanding Nighttime Visibility; The Role of Bias in Crash Investigation; Signal Detection Theory in Crash Investigations; The CAPLETS Approach, Hands-on Techniques for Scene Documentation; and Developing Best Practices.

### **PhotoModeler Technologies**

#### ***PhotoModeler Training Course for Collision Investigation – Dan Mills and Tod Whitfield***

**November 27-30, 2023, Vancouver, BC Canada – Via Zoom**

Successfully completed a four-day virtual training course. Topics included: Photography Techniques; Scene Diagramming and Mapping from Photos; Scene and Crush Measurements; Evaluating Accuracy and Developing Standard Operating Procedures; Exporting to CAD Software for Diagramming; Measurements from Single Photos and/or Photos from Unknown Cameras; Photo-Realistic Surfacing for Visualization and Rendering; Orthophoto and Rectified-Photo Generation; Video Frame Analysis from Body/Surveillance/Dash Camera Footage; Working with LIDAR 3D Scan Data; Use of Drones and UAV in Accident Reconstruction; UAV Flight Planning and Ground Control Points; and Admission of Photogrammetry and PhotoModeler in Court.

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**Driver Research Institute, LLC**

***Advanced Human Factors Class - Jeffrey Muttart, Ph.D. and Timothy Maloney***

**October 16-20, 2023, Gilford, New Hampshire**

Satisfactorily completed a five-day course of instruction. Topics included: Perception-Response Time; Response to Slow Moving or Stopped Vehicles on Multilane High Speed Roads; Nighttime Recognition; Drivers' Decision Making; Research, IDRR/Response; Gap Acceptance; Pedestrian Walking Speeds; Acceleration; Forward and Backing Acceleration of Cars, Motorcycles, and Commercial Vehicles; Drivers' Responses at Green and Yellow Traffic Signals; Deceleration Choice, Reaction Time, and Probability of Stopping; and Rules of Thumb.

**Forensic Training Group, LLP**

***Heavy Vehicle Event Data Recorder (HVEDR) Use in Traffic***

***Crash Investigation Analyst Training***

**June 19-22, 2023, Oklahoma City, Oklahoma**

Attended a four-day training course. Topics included: History, Development, and Function of Heavy Vehicle Digital Forensics; Best Practices to Access and Document HVEDR Data; HVEDR Data Available on Heavy Trucks; Use of OEM Software/Adapters, Synercon Forensic Link Adapter, and TruckCRYPT Software; and Validation Testing Case Analysis.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Ignition Cyclopedia – Kent Boots***

**May 5, 2023 (via Zoom)**

Attended a two-hour online webinar.

**WREX 2023 (World Reconstruction Exposition)**

***Sponsored by 23 crash reconstruction associations from around the world***

**April 17-21, 2023, Orlando, Florida**

Attended a five day event. Topics included: Keynote address by Wade Bartlett and Lou Peck; A Historical Perspective on Technology in Reconstruction; Collision Reconstruction is Evolving; Toyota Tech Stream Software VCH Research and Testing; GPS Data: Sources, Analysis, and Presentation; Commercial Motor Vehicle Collision Mitigation Systems; EDR Accuracy of Modern Vehicles; HVEDR Update; Working with GoPro and GPS Data; Automotive Test Equipment, DTCs and Pre-Crash Data; Accessing Toyota Event/Camera Data through Tech Stream Software; Facts Don't Sell Themselves: Persuading Your Audience with Visual Aids; The Importance of Tires in Accident Investigation; Introduction to Forensic Acquisition of Mobile Devices in Accident Reconstruction; Determining the 85<sup>th</sup> Percentile Speeds from Traffic Video; Methods for Establishing Motorcycle Impact Speeds; Simulated Look at Effects of Pedestrian Lateral Velocity; Learning the Proper Methodologies from the Mistakes of Others; Guardrail End Terminal Crash Reconstruction; Time v. Distance Analysis in Crash Reconstruction; Analysis of Sideswipes and Glancing Impacts; Accurate Measurements by Combining Images or Video with Laser Scans; Next Generation GM EDRs; ATV Collision Investigations; Retroreflective Material Analysis; Bicycle/E-Bike Performance; Use of Mobile Lidar in Collision Reconstruction; Forensic Video Analysis; Photometry for Forensic Investigators; ADAS and Advanced Safety Systems in Passenger Vehicles;

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Injury Biomechanics in Accident Reconstruction; Injury Reconstruction with Biofidelic Dummy; Mobile Device/Infotainment System/Chip Swap Forensics; Comparison of Vehicle Drag Factors on Various Surfaces; OEM Representation; Semi-Trailer Underrides-Turning Tragedy into Advocacy; Distracted Driving Investigations; Frozen Speedometer Reliability; One Full Day of Crash Testing; and Crash Test Review. Participant in Driver Eye Tracking Study.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Human Factors – Dr. Susan Lantz, Lantz Biomechanics***

**April 4, 2023 (via Zoom)**

Attended a two-hour online webinar.

**Recon-3D**

***User Group Meeting***

**March 21, 2023**

Attended a four-hour webinar. Topics included: Recon-3D Update; Recon-3D at Crime and Crash Scenes; Recon-3D for use in Bullet Trajectory Documentation; Accuracy and Comparisons to the RTC360; Bloodstain Pattern Documentation & Area of Origin Analysis with Recon-3D; Use of Targets; Comparison of Recon-3D with Faro Scanner; Accuracy and Repeatability of Mobile Phone Lidar Capture; Scanning Techniques for Tractor Trailer Scanning; Remote Viewing with A-Power Mirror (Presenter); and Comparison of Recon-3D to Terrestrial Laser Scanner Data.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Aerial Photogrammetry in Crash Reconstruction – Andrew Klane***

**Certification of Completion received March 17, 2023**

Attended a two-hour online training class. Topics included Overview of Aerial Photography using UAVs and Pix4D.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***State of EDR in US – EDR Update – Andrew Rich, Rich Consulting, LLC***

**Certificate of Completion received February 25, 2023**

Attended a two-hour online webinar. Topics included: Active Safety Control Module (ASCM); Toyota Vehicle Control History (VCH) Module that includes Photographs; Front Camera Module (FCM); Repowering (backpower) Modules; CDR 900 Imaging Protocols; EDR Accuracy; EDR Module and Relationship to Vehicle Center of Mass; and EDR Imaging Protocols – Order of Operations.

**Crash Safety Solutions, LLC – Driver Research Institute**

***2022 IDRR Training – Jeffrey Muttart, Ph.D and Swaroop Dinakar***

**November 28-30, 2022, Windsor Locks, Connecticut (via Zoom)**

Attended a three-day virtual conference providing hands on, step by step case studies and application of IDRR spreadsheets to specific crash scenarios. Included preview of the new online IDRR Response interface.



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**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Vehicle Spin Analysis – George Meinschein***

**Certificate of Completion received November 18, 2022**

Attended a two-hour webinar.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Conservation of Linear Momentum – Greg Russell***

**Certificate of Completion received October 28, 2022**

Attended a two-hour webinar.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**

***Traffic Crash Investigation and Reconstruction Services***

**Certificate of Completion received October 21, 2022**

Attended a two-hour webinar covering research related to crash reconstruction and research sources.

**Virtual CRASH, LLC – vCRASH Academy**

***Virtual CRASH Live Classroom Training***

**October 18-20, 2022, Gainesville, Florida**

Satisfactorily completed a three-day course of instruction. Topics included The Software Interface; Understanding Simulation Inputs; Building 3-D Environments using Total Station, Point Cloud Data, and Drone Imagery; Using the Path Animation Tool; Using the Momentum Solver; and Reconstructing Staged Collisions (including Motorcycle Impacts).

**Rich Consulting, LLC**

***Using Microsoft Excel for Traffic Crash Reconstruction***

**Certificate of Completion received June 3, 2022**

Successfully completed an on-line class. Topics included EDR Closing Speed Analysis of EDR Stability Control Data; Using EDR Acceleration Data to Calculate Delta-v for Chrysler and Toyota; Spin Analysis; Conservation of Linear Momentum (“360° Momentum”); Airborne; Critical Speed Yaw; Sensitivity Analysis; Monte Carlo Analysis; Advanced Monte Carlo Analysis; Making Decisions with IF Function; CRASH3 (Crush); Stiffness Coefficients; Minimum Speed; and Pedestrian Crash Case Analysis.

**Crash Safety Solutions, LLC**

***2022 Interactive Driver Response Research (I.DRR) User Forum***

**March 13-15, 2022, San Diego, California (via Zoom)**

Attended a three-day virtual conference. Topics included Overview of New Spreadsheets in I.DRR 2022; Discussion of New and Updated Research; Review of New Spreadsheets with Step by Step Case Studies on the Application of I.DRR to Specific Crash Scenarios.

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**Northwestern University Center for Public Safety (NUCPS)**  
**National Association of Professional Accident Reconstruction Specialists (NAPARS)**  
***Heavy Vehicle Forensic Mechanical Inspection for Collision Investigators***  
**November 8-12, 2021, Chattanooga, Tennessee**

Satisfactorily completed a five-day course of instruction. Topics included Safety Considerations including OSHA Lock Out-Tag Out; Heavy Vehicle Nomenclature; Brakes-Air (S-cam, Wedge, and Disc), Hydraulic, and Electric; Heavy Truck ABS and ATC Systems; Suspension and Wheel End Components; Tires; Transmission Gear Position and Rear Axle Ratios; Connecting Devices (Trailing); Plumbing into and Restoring the Air System; Calculating Brake Force; and Proper Forensic Investigation Methods.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**  
**and Maryland Association of Traffic Accident Investigators (MATAI)**  
***2021 Annual Joint Conference – Back to Basics***  
**October 6-8, 2021, Ocean City, Maryland**

Attended a two-day conference. Topics included Human Factors, Scene Documentation, Critical Speed, Momentum, Energy, Tire Failure, CDR Update, and Live Crash Testing.

**National Association of Professional Accident Reconstruction Specialists (NAPARS)**  
***Tire Forensics Class – T.J. Tennent***  
**March 24-26, 2021, Chattanooga, Tennessee**

Attended a three-day conference. Topics included Why Tires are Important, Tire Performance Requirements, Tire Construction Basics, Vehicle Door Placard, UTQG (Uniform Tire Quality Grading), Load Index, Tire Deflection, Proper Tire Maintenance, Tire Repairs, Air Pressure Effects on Tires, Tire Application Guidelines, P-Metric vs. Euro-Metric vs. Light Truck, Truck/Bus Radial (TBR) Basics, Materials, Components, Repairs, Tire/Rim Load Capacity vs. GAWR, and Failure Analysis (hands on).

**Ai2-3D Forensics**  
***CloudCompare***  
**Certificate of Completion received November 24, 2020**

Successful completion of six-hour online course. Topics included: Overview of Cloud Compare Controls; Point Picking; Segment Tool; Subsampling Point Clouds; Creating Point Cloud from Mesh; Translate/Rotate Point Clouds; Scaling Point Clouds; Creating Cross Sections; Slicing Cross Sections; Ambient Occlusion; Virtual Broom; Animation, “Fly Throughs”; Creating a Mesh; and Aligning Multiple Point Clouds.

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**Texas Association of Accident Reconstruction Specialists**  
**2020 Virtual Fall Conference – Human Factors and Nighttime Visibility**  
**October 21-23, 2020**

Attended one five-hour virtual presentation (Day 2). Topics included Photographs and Videos (Calibration Methods); Lighting Simulations (Mapping Headlights); Object Detection (Contrast, Pattern, and Glare); and Roadway Lighting.

**National Association of Professional Accident Reconstruction Specialists (NAPARS) Maryland Association of Traffic Accident Investigators (MATAI), National Association of Traffic Accident Reconstructionists and Investigators (NATARI), New Jersey Association of Accident Reconstructionists (NJAAR), New York Statewide Traffic Accident Reconstruction Society, Inc. (NYSTARS)**  
**2020 Joint Virtual Conference (via Zoom)**  
**October 5-13, 2020**

Attended four two-hour virtual presentations. Topics included Investigating and Reconstructing Rollover Crashes; Perception Response Times for Various Crash Types; Chip Level Data Recovery; and Using Freightliner New Cascadia ECM data in Accident Reconstruction.

**National Association of Professional Accident Reconstruction Specialists (NAPARS) and New Jersey Association of Accident Reconstructionists (NJAAR)**  
**2019 Joint Conference – Human Factors and Distracted Driving**  
**October 8-10, 2019, Atlantic City, New Jersey**

Attended a three-day conference. Topics included Event Data Recorder (EDR) Update; Distracted Driving Investigation - Technology & Innovative Methods for Distracted Driving Crash Investigations; Investigation of Emergency Vehicle Crashes; Crash Risk Associated with Driver Distraction and Drowsiness: The Latest Findings from Naturalistic Driving Studies; Investigating Human Fatigue Factors in Transportation Events; Sleep Need, Sleep Disorders, Medical Conditions, and Circadian Rhythms; Electronic Logging Devices (ELD) for Commercial Motor Vehicles; Occupant Kinematics; and Reducing Road Fatalities with Artificial Intelligence.

**Forensic Mapping Solutions, Inc.**  
**Pix4D Mapper Software and Part 107 Training**  
**August 27-30, 2019, Hartford, Vermont**

Successfully completed 32-hour course of instruction. Topics included: FAA Part 107 UAV Training; Photogrammetry; Image Capture; Georeferencing; Verifying Accuracy; Data Processing; Outputs/Workflow; and The Quality Report and Processing Options.

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**vCRASH, Americas, Inc. - vCRASH Academy**  
***Building Environments – Self-Paced Training Course***  
**June 2, 2019**

Topics included: Importing and Scaling Aerial Images and Diagrams; Using the Google Earth tool; Importing Total Station Data and Orienting the Data on Top of Aerial Imagery; Importing Point Cloud Data; Creating Surface Meshes from Point Clouds; Simulating on Top of Surface Meshes; Drawing Scale Diagrams Using the CAD Tools; and Using the Traffic Signal Objects.

**Crash Data Specialists, LLC**  
***Crash Data Retrieval (CDR) System Operator/Analyst Course***  
**April 1-5, 2019, Bedford, New Hampshire**

Topics included: CDR: Terms and Conventions Found in Relation to CDR/EDR Field; Airbag Deployment Decision-Making Basics; Crash Sensing and Critical Timelines; Crash Pulse Recording Methodologies Currently Used; Delta-V Recording Variations; Pre-Crash Data Sources; Chrysler Supported Vehicle Reports and Recorded Data From First Coverage up to the Most Recent Supported Vehicles; Ford Supported Vehicle Reports Including ACM and PCM (Power Train Control Modules) Data Elements from Beginning of Ford CDR Coverage up to the Latest ACM, Which Now Contains Pre-Crash Data; Ford PCM Data Timing Relating Impact to “Time 0” and Restraint Deployment Signal (RDS) Reception; General Motors CDR Reports by Generation Including ROS (Rollover Sensor) Data, Engineering Translation Reports Including the Latest Model Year 2010/2011 ACM Data and Variants; Accuracy and Reliability as Displayed Through Results of Controlled Testing from Various Sources; and Case Studies and In-Class Assignments to Tie CDR Report Analysis to Crash Investigation.

**vCRASH, Americas, Inc. - vCRASH Academy**  
***Simulation Basics – Self-Paced Training Course***  
**December 6, 2018**

Topics included: The Dynamics Menu; The Diagram Tool; Accessing Reports and Simulation Data; Sequences: Steering, Braking, and Accelerating; Fast Control Icons; The Auto Driver; Basic Vehicle Collisions; and Basic Pedestrian Impacts.

**vCRASH, Americas, Inc. - vCRASH Academy**  
***The Virtual CRASH Interface – Self-Paced Training Course***  
**December 3, 2018**

Topics included: Importing and Scaling Aerial Images and Diagrams; Using the Google Earth Tool; Importing Total Station Data and Orienting the Data on Top of Aerial Imagery; Importing Point Cloud Data; Creating Surface Meshes from Point Clouds; Simulating on Top of Surface Meshes; Drawing Scale Diagrams Using the CAD Tools; and Using the Traffic Signal Objects.

**MICHAEL S. SORENSEN**  
**Accredited Crash Reconstructionist**  
**The Crash Lab, Inc.**

**Post Office Box 850**  
**Hampton, N.H. 03843-0850**  
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**Pennsylvania State Police**  
***Collision Reconstruction Seminar 2018***  
**October 30 to November 1, 2018, Gettysburg, Pennsylvania**

Topics included: Electronic Logging Devices; Multi-Sensor Scene Documentation; NTSB and Automated Vehicle Crash Investigations; Acceleration; Sensitivity Analysis; Distracted Driving Investigation; Advanced Motorcycle Crash Analysis-Crush Energy; and Deconstructing Impaired Driving: The State of Research and Practice.

**Crash Safety Solutions, LLC**  
***Human Factors in Traffic Crashes – Jeffrey W. Muttart, Ph.D***  
**June 25-29, 2018, East Hampton, Connecticut**

Topics included: Rules of Thumb-How to Apply PRT; Expectancy (actionable information) Saliency; IDRR Overview, Training, Research; Closing Speed Crashes; Closing Distance; Lane Change Prep; Closing Speed; Consumer Reports Auto Test Center Tour and Methodology for Testing; Path Intrusion Case Studies; Exercises: Reaction Time, Eye Tracking, Closing Speed; and Night Recognition and Documenting a Scene.

**Rich Consulting, LLC**  
***Excel for Traffic Crash Reconstruction***  
**December 13-15, 2017, Morristown, New Jersey**

Topics included: Using Microsoft Excel for Traffic Crash Reconstruction; Introduction to Excel; Writing Formulas in Excel; Statistics Primer for Excel; Using Excel for Spin Analysis; Using Excel for Stiffness Coefficients and Damage Analysis; Introduction to Uncertainty and Sensitivity; Sensitivity Analysis; Performing Monte Carlo Analysis with Excel; Performing Finite Difference Analysis with Excel; Graphing; Programming User Defined Reconstruction Functions and Add-ins; Solving Momentum Equations Using Solver; Programming Dialog Boxes; Conditional Formatting and Conditional Formula Execution; Using Excel to Solve Woods' Pole Impact Algorithm; and Option Buttons.

**Massachusetts State Police - Sgt. Ed O'Hara**  
***Crash Data Retrieval Technician Course***  
**June 2017, Concord, New Hampshire**

Topics included: Understand the Relevant History of Event Data Recorders (EDR) and the Bosch<sup>®</sup> CDR Tool; Learn Common "Terms of Art" for EDR Technology; Load and Activate the Bosch<sup>®</sup> CDR Tool Software; Use of the Bosch<sup>®</sup> CDR Tool Help File as a Current and Future Resource; Collect EDR Data Using the Bosch<sup>®</sup> CDR Tool; Troubleshoot Data Collection Issues; Prevent Spoliation of EDR Data; and Legal Considerations.

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**Motorcycle Safety Foundation (MSF)**

***Basic Rider Course***

**May, 2016, Dummerston, Vermont**

Topics included: Motorcycle Familiarization; Using the Friction Zone; Starting & Stopping Drill; Shifting & Stopping; Basic Skill Practice; Pressing to Initiate and Adjust Lean; Stopping More Quickly & Tight Turns from a Stop; Stopping Distance Demonstration; Limited-Space Maneuvers; Stopping in a Curve; Curve Judgment; Multiple Curves & Lane Changes; Crossing an Obstacle & Swerving; Skill Practice; and Skill Test.

**Pennsylvania State Police**

***Collision Reconstruction Seminar 2015***

**October 13-15, 2015, State College, Pennsylvania**

Topics included: Occupant Kinematic Basics; Determining Vehicle Operator Fatigue in Accident Reconstruction; Data Latency and its Influence on EDR Speed at Impact; Below 100; CDR Update; CMV Regulations and Guidance on Obtaining Relevant Evidence in CMV Crashes; Using EDR Delta-V to Calculate Closing/Impact Speeds; Forensic Evidence from Traffic Crash Fatalities; and Human Factors – Results of Nighttime Field Testing.

**Pennsylvania State Police**

***Collision Reconstruction Seminar 2014***

**September 24-26, 2014, State College, Pennsylvania**

Topics included: Sources of Data from Commercial Motor Vehicles; Crash Testing; Smart Phone Applications for Reconstruction; Tire Failures; Video Analysis for Crash Investigation; Step by Step Analysis of a Nighttime Pedestrian Crash; and Spin Analysis.

**Pennsylvania State Police**

***Reconstruction Seminar 2012***

**September 25-27, 2012, State College, Pennsylvania**

Topics included: CRUSH Measurement Protocol; Trace Evidence; Forensic Analysis; Vehicle Examinations; Digital Photography; and Expert Testimony.

**ARAS 360**

***Diagramming Course***

**July 20, 2011, Royalton, Vermont**

Topics included: Importing measurement logs; Creating 2D and 3D diagrams; and 2D and 3D animation.

**Visual Statement**

***Basic/Advanced Diagramming and Animation with Total Station***

**2009, Williston, Vermont**

Topics included: Total Station set up and use; Creating and importing measurement logs; and CAD diagramming.

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**Institute of Police Technology and Management (IPTM)**

***Motorcycle Crash Investigation***

**June 1-5, 2009, Braintree, Massachusetts**

Topics included: Analyzing and Interpreting the Motorcycle Crash Scene; Determining Acceleration and Deceleration Characteristics of the Motorcycle; Analyzing and Interpreting Modes of Instability and Handling Characteristics in Motorcycles; Interpreting Operator Factor; Reviewing Motorcycle Tires, Helmets, and Other Equipment; and Using a Practical Application of Formulas (Projects).

**Massachusetts State Police - Sgt. Ed O'Hara**

***Crash Data Retrieval Technician Course***

**November 2008, Royalton, Vermont**

Topics included: Understand the Relevant History of Event Data Recorders (EDR) and the Bosch<sup>®</sup> CDR Tool; Learn Common "Terms of Art" for EDR technology; Load and Activate the Bosch<sup>®</sup> CDR Tool Software; Use of the Bosch<sup>®</sup> CDR Tool Help File as a Current and Future Resource; Collect EDR Data Using the Bosch<sup>®</sup> CDR Tool; Troubleshoot Data Collection Issues; Prevent Spoliation of EDR Data; and Legal Considerations.

**Institute of Police Technology and Management (IPTM)**

***Traffic Crash Reconstruction***

**January 30-February 10, 2006**

Topics included: Derivation and Origin of the Commonly Used Speed Formulas; Speed of Vehicles at Impact Using Conservation of Linear Momentum; Behavior of Vehicles in a Collision Using Newton's Three Laws of Motion; Discussions of Commercial Vehicle and Motorcycle Dynamics in Collisions; and The Determination of Direction of Travel, Initial Contact, and Position of Vehicles on the Roadway.

**Institute of Police Technology and Management (IPTM)**

***Advanced Traffic Crash Investigation***

**July 24-August 4, 2000, Braintree, Massachusetts**

Topics included: Speed Estimates from Kinetic Energy, Skidmarks, Scuffmarks, and Airborne Situations; Vehicle Dynamics and Motion; Time, Distance, and Motion Equations; Conservation of Momentum Equations; Center of Mass Calculation; Vehicle Lamp Examination; Tire Damage Evaluation; and Vector Sum Analysis.

**Norwich University**

***Bachelor of Arts, Psychology and Leadership***

**June 18, 2000**

**North American Standard Truck Inspection (NASTI)**

**November 27-December 8, 1995, New Braintree, Massachusetts**

**Massachusetts State Police**

***The Brake Doctor***

**October 17-18, 1995, New Braintree, Massachusetts**

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**North American Standard Truck Inspection (NASTI)**  
**February 6-7, 1995, Pittsford, Vermont**

**Vermont Criminal Justice Training Council and Institute of Police Technology and Management (IPTM)**  
***At Scene Accident Investigation Course***  
**October 24-November 4, 1994, Vermont Police Academy, Pittsford, Vermont**

Topics included: Physical Evidence from the Roadway; Physical Evidence from the Vehicle; The Human Element and Occupant Kinematics; Mathematical Principles and Equations; Skidmarks and Vehicle Speeds; Crash Scene Photography; Traffic Templates; Measuring and Scale Diagramming; Driver and Witness Interviews; and Information Analysis and Case Preparation.

**Massachusetts State Police**  
***Cargo Tank Roadside Inspection***  
**March 9, 1993, New Braintree, Massachusetts**

**North American Standard Truck Inspection (NASTI) - Update**  
**February 24, 1993, Pittsford, Vermont**

**Massachusetts State Police**  
***Hazardous Materials HM181***  
**October 5-9, 1992, Framingham, Massachusetts**

**North American Standard Truck Inspection (NASTI)**  
**October 21-25, 1991, Framingham, Massachusetts**

**ASSOCIATIONS/MEMBERSHIPS:**

- Member, National Association of Professional Accident Reconstruction Specialists, Inc. (NAPARS)
- New York Statewide Traffic Accident Reconstruction Society, Inc. (NYSTARS)