

COLLISION DYNAMICS, LLC

Accident Investigation and Reconstruction

4425 East Agave Road, Suite 106, Phoenix, Arizona 85044

(480) 759-4807

www.col-dyn.com

Timothy M. Pebler

CURRICULUM VITAE

EDUCATION

- 1988 to 1990 Mesa Community College, Mesa, Arizona.
Major: Mechanical Engineering.
- 1986 to 1987 Northern Arizona University, Flagstaff, Arizona.
Major: Mechanical Engineering.
- 1974 to 1975 Phoenix College, Phoenix, Arizona.
Major: Police Science.

PROFESSIONAL EXPERIENCE

- 2008 to present Private Pilot.
- 1983 to present Traffic Accident Reconstruction Consultant, Collision Dynamics, LLC and Timothy M. Pebler Accident Reconstruction.
- 1994 to 2000 Mechanical Consultant, Schwimmer Engineers, Tempe.
- 1989 to 1993 Mechanical Designer, Mechanical Engineering Section, Sverdrup Corporation, Phoenix.
- 1980 to 1987 Traffic Accident Reconstructionist, Arizona Department of Public Safety, Districts Two and Twelve.
- 1979 to 1987 Arizona Highway Patrolman.
- 1977 to present Accident Investigation/Reconstruction Instructor.
- 1976 to 1979 Police Officer and Accident Reconstructionist, Scottsdale Police Department.

PROFESSIONAL REGISTRATIONS AND SOCIETIES

- 1996 to present **Society of Automotive Engineers (SAE).**
- 1994 to present **Commission Accredited Traffic Accident Reconstructionist**, Registration Number 612, Accreditation Commission for Traffic Accident Reconstruction (ACTAR).
- 1988 to present **National Association of Professional Accident Reconstruction Specialists (NAPARS).**
- 1982 to present **Southwestern Association of Technical Accident Investigators.**
Member, Board of Directors and former Secretary.
- 2007 to present **Aircraft Owners And Pilot Association (AOPA)**

COURTROOM EXPERIENCE

Qualified expert witness in Federal District Court, Phoenix; Maricopa, Coconino, Navajo, Pima, Pinal, Yavapai, Gila, and Apache County Superior Courts; Maricopa, Coconino and Yavapai County Justice Courts and in arbitration hearings in Arizona and California.

ADDITIONAL EDUCATION AND TRAINING

- 2015 **MOTOR VEHICLE ACCIDENT RECONSTRUCTION**, Rudolf Limpert, Ph.D., PC-BRAKE, Inc., Gilbert, Arizona.
- 2015 **ADVANCED CRASH RECONSTRUCTION UTILIZING HUMAN FACTORS**, Jeffrey W. Muttart, Ph.D., Crash Safety Research Center, LLC, Glendale, Arizona.
- 2015 **HUMAN FACTORS**, Jeffrey W. Muttart, Ph.D., Crash Safety Research Center, LLC, **COMPLIANCE CRASH TESTING**, Frank Richardson, and **3D LASER SCANNING**, Jonathan Balasa, Collision Engineering Associates, Southwestern Association of Technical Accident Investigators, Glendale, Arizona.
- 2014 **USING MICROSOFT EXCEL FOR TRAFFIC CRASH RECONSTRUCTION**, Andrew Rich, rich Consulting, LLC, Tempe Police Department, Tempe, Arizona.
- 2014 **APPLIED PHYSICS AND ROTATIONAL MECHANICS**, Bruno Schmidt, Ph.D., Southwestern Association of Technical Accident Investigators, Glendale, Arizona.
- 2014 **INTERACTIVE DRIVER RESPONSE RESEARCH WORKSHOP (IDRR)**, Jeffrey W. Muttart, Ph.D., Crash Safety Solutions, LLC; Midwest Association of Technical Accident Investigators, St. Paul, Minnesota.
- 2014 **EVALUATING A DRIVER'S RESPONSE IN A NIGHTTIME CRASH**, Jeffrey W. Muttart, Ph.D., Crash Safety Solutions, LLC; Southwestern Association of Technical Accident Investigators, Laughlin, Nevada.
- 2013 **MOMENTUM AND SIMULTANEOUS EQUATIONS**, Gary Cooper, Cooper Barrett Consulting, LLC; **TIRE FORENSICS**, David Hallman, M.S., P.E., Hallman Engineering; Southwestern Association of Technical Accident Investigators, Glendale, Arizona.
- 2012 **CDR DATA ANALYSIS CERTIFICATION COURSE**, Rusty Haight, Collision Safety Institute; Southwestern Association of Technical Accident Investigators, Glendale, Arizona.
- 2012 **COMMERCIAL MOTOR VEHICLE AIR BRAKE SYSTEMS**, Mark Beadles, Phoenix Police Department; **COMMERCIAL MOTOR VEHICLE COLLISION INVESTIGATIONS – METHODS AND MYTHS**, John Allen, Arizona Department of Public Safety; Southwestern Association of Technical Accident Investigators, Glendale, Arizona.
- 2010 **MONTE CARLO ANALYSIS METHODS APPLIED TO CRASH RECONSTRUCTION**, Roger W. Barrette, Cooper Barrette Consulting; **VEHICLE OFF-TRACKING APPLIED TO VEHICLE CRASH RECONSTRUCTION**, Gary Cooper, Cooper Barrette Consulting; Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2010 **FULLY INSTRUMENTED TWO-VEHICLE CRASH TEST**, Southwestern Association of Technical Accident Investigators; **SAFETY IN THE MAKING – THE BUSINESS OF MAKING SAFER CARS**, Patricia B. Fyhrie, Ph.D.; **DATA FROM NON-CDR SYSTEM OEM'S**, Wesley Vandiver., Orange County District Attorney's Office, Vehicular Homicide Unit; and **ADVANCEMENTS IN TRAFFIC SAFETY**, Michael J. Cyneckie, P.E., City of Phoenix Traffic Engineering.; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2009 **AFTERMARKET COMPONENTS AND THE EDR/EDR DISCREPANCIES**, Mark Salem, Salem Boys Auto; **STIFFNESS DATA RESEARCH AND CALCULATIONS**, Daniel W. Vomhof, III, 4N6XPRT Systems; **EXPERTS AND LAWYERS IN THE COURTROOM**, Joel B. Robbins, Esq., Robbins & Curtin, PLLC; and **THOSE LYING BLACK BOXES – WHAT YOU NEED TO KNOW**, Stephen E. Van Gaasbeck, Esq.; Southwestern Association of Technical Accident Investigators, San Diego, California.

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- 2009 **FULLY INSTRUMENTED VEHICLE ROLLOVER CRASH TEST**, Southwestern Association of Technical Accident Investigators; **MADYMO IN ACCIDENT RECONSTRUCTION**, Tony Bromwell, TASS Americas; **BIOMECHANICAL ANALYSIS OF ROLLOVER CRASHES**, Carley Ward, Ph.D., Biodynamics Engineering, Inc.; **SEAT BELTS IN ROLLOVER CRASHES**, Jeff Wirth, P.E., Driven Engineering, Inc.; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2009 **MOTORCYCLE BRAKING**, Wade Bartlett, Mechanical Forensics Engineering Services, LLC; **MOTORCYCLE CRUSH ANALYSIS**, Wade Bartlett, Mechanical Forensics Engineering Services, LLC; **OVERVIEW OF MOTORCYCLE SAFETY**, Steve Guderian, Motorcycle Safety Consulting; **HUMAN FACTORS FOR TRAFFIC CRASH RECONSTRUCTION – AN OVERVIEW**, Jeff Muttart, Accident Dynamics Research Corporation; Southwestern Association of Technical Accident Investigators, Laughlin, Nevada
- 2008 **CRITICAL SPEED YAW ANALYSIS AND TESTING**, John Daily, Jackson Hole Scientific Investigations, Inc. and Nathan Shigemura, The Traffic Safety Group, LLC; **POLE AND NARROW OBJECT IMPACTS**, John Daily, Jackson Hole Scientific Investigations, Inc. and Nathan Shigemura, The Traffic Safety Group, LLC; **EXPLORING UNIFORM PROJECTILE MOTION AND AIRBORNE APPLICATIONS**, John Daily, Jackson Hole Scientific Investigations, Inc. and Nathan Shigemura, The Traffic Safety Group, LLC; **AN INTRODUCTION TO ROTATIONAL MECHANICS**, John Daily, Jackson Hole Scientific Investigations, Inc. and Nathan Shigemura, The Traffic Safety Group, LLC; Southwestern Association of Technical Accident Investigators, San Diego, California
- 2008 **SMALL BUSINESS ADMINISTRATION**, Martin Robbins, SCORE, Southwestern Association of Technical Accident Investigators, Phoenix, Arizona
- 2007 **THE USE OF MOMENTUM IN CRASH RECONSTRUCTION**, Gary W. Cooper, Cooper Barrette Consulting; **COMMON ERRORS IN POST IMPACT TRAJECTORIES**, Bruno Schmidt, Schmidt Consulting Services, LLC; **NEWTON'S LAWS – GOING BEYOND THE FORMULAS**, Bruno Schmidt, Schmidt Consulting Services, LLC; **NEW DEVELOPMENTS IN EVENT DATA RECORDERS**, Richard Ruth, Ruth Consulting LLC; **INVESTIGATION AND INSPECTION OF VEHICLES IN ROLLOVER ACCIDENTS**, Don Stevens, Safety Engineering and Forensic Analysis; Southwestern Association of Technical Accident Investigators, San Diego, California
- 2007 **HEAVY TRUCK V. PASSENGER VEHICLE CRASH TESTING**, SATAI, Phoenix, Arizona; **HEAVY TRUCK CRASH RECONSTRUCTION**, Charles Dickerson, Collision Engineering Associates; **AIR BRAKE SYSTEMS ON COMMERCIAL VEHICLE**, Officer Mike Dropik, Phoenix Police Department; **LOW SPEED BUMPER TO BUMPER VS. BUMPER TO HITCH COLLISION ANALYSIS**, Billy Cox, EFI Global; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2007 **AIRBORNE VEHICLES**, Weston Brown, Scottsdale Police Department; **MOMENTUM**, A. Keith Miller, Keith Miller & Associates; and **VARIOUS TOPICS IN ACCIDENT RECONSTRUCTION**, Dr. Rudolf Limpert, **PCBRAKE**; Southwestern Association of Technical Accident Investigators, Laughlin, Nevada.
- 2006 **TRUCK BRAKE ISSUES**, David Stopper, Stopper & Associates; **CONSPICUITY AND OTHER TRUCK VISIBILITY ISSUES**, David Stopper, Stopper & Associates; **HUMAN ASPECTS AND FEDERAL TRUCK REGULATIONS**, Bob Coulter; and **FEDERAL MOTOR CARRIER COMPLIANCE**, Donald Carr, Special Agent & Field Safety Supervisor, Federal Motor Carrier Safety Administration; Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2006 **MOTORCYCLE V. AUTOMOBILE CRASH TESTING**, SATAI, Phoenix, Arizona; **MOTORCYCLE INJURIES**, Michael Iliescu, MD, Maricopa County Medical Examiner, and Patrick Hannon, Ph.D., Hannon Biomechanics; **DYNAMICS OF MOTORCYCLE CRASH**, Paul Olson; and **CRASH HELMET IMPACT TESTS, HOW STANDARDS AFFECT HELMET DESIGN**, Ed Becker, Executive Director Snell Foundation; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2006 **ELECTRONIC STABILITY CONTROL (ESC) TESTING AND DATA PRESENTATION**, Timothy M. Reust, Accident Science, Inc.; **ELECTRONIC STABILITY CONTROL (ESC)**, Robert E. Larson, P.E., Exponent - Failure Analysis Associates; and **HUMAN FACTORS**, Michael J. Kuzel, Exponent - Failure Analysis Associates; Southwestern Association of Technical Accident Investigators, Laughlin, Nevada.
- 2005 **ACCIDENT RECONSTRUCTION SYMPOSIUM**, Society of Automotive Engineers (SAE), Ventura Beach, California. Topics included: **The Impact Models in PC-Crash** - William E. Cliff, P.E., MEA Forensic Engineers & Scientists; **Computer Simulation Analysis of Vehicle Stability and Handling and Accident Reconstruction** - R. Wade Allen, Systems Technology; **The Use of Spreadsheet Optimizers and Monte-Carlo Add-Ins** - Raymond M.

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- Brach, PhD, PE, University of Notre Dame; **Pulse Modeling Applications and Case Studies** - Alan Asay, Wooley Engineering Research Corporation; **The Accuracy of Photogrammetry in Accident Reconstruction** - Joshua Goldwitz, Exponent, Inc.; **Recent Photogrammetry Developments and Accident Reconstruction Needs** - J. Rolly Kinney, Kinney Engineering; **Demystifying Digital for Accident Reconstruction: From Click to Client** - Tom Vadnais, Vadnais, Wood & Rivers; **The Accuracy of EDR Data in NHTSA Frontal Crash Testing** - Clay Gabler, PhD, Virginia Tech - Wake Forest University; **Using NASS to Understand Vehicle Rollover Behavior** - Stein E. Husher, KEVA Engineering; **Critical Speed Yaw Analysis** - Wade Bartlett, P.E., Mechanical Forensics Engineering Services; **The Accuracy of WinSmash: The Influence of Vehicle Type, Stiffness, and Impact Mode** - Clay Gabler, PhD, Virginia Tech - Wake Forest University; **Commercial Vehicle Event Data Recorders & Accident Reconstruction** - Timothy J. Reust, Accident Science; **Motorcycle Cornering and Braking: Lessons for Accident Causation** - Michael S. Varat, KEVA Engineering; **Standards Activity and Crash Pulse Interpretation Opportunities with EDR's** - Joseph C. Marsh, Ivy Consultancy.
- 2005 **APPLICABILITY OF CRUSH ANALYSIS FORMULAS**, Daniel W. Vomhof III; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2004 **CRASH DATA RETRIEVAL (CDR) USER CERTIFICATION COURSE**, Bruce James "B.J." Turner, Turner Consulting, L.L.C. and George Bruce Gasdick, Institute of Police Technology and Management (IPTM), Tempe, Arizona.
- 2004 **PC-CRASH TRAINING WORKSHOP**, Bill King, MacInnis Engineering Associates, Las Vegas, Nevada.
- 2004 **COMMERCIAL VEHICLE POST COLLISION MECHANICAL INSPECTION**, Alan Coulter, Coulter & Associates, Inc.; Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2004 **COMMERCIAL VEHICLE STANDARDS & RULES**, Matthew Meyerhoff, Phoenix, Arizona; **COMMERCIAL VEHICLE EVENT DATA RECORDERS (EDR)**, Timothy J. Reust, Accident Science, Inc.; Southwestern Association of Technical Accident Investigators, San Diego, California. Included two deceleration to stop tests of a City of San Diego Fire Department truck equipped with a commercial vehicle event data recorder.
- 2004 **RECONSTRUCTION and MATHEMATICAL COLLISION ANALYSIS / SIMULTANEOUS EQUATIONS to SOLVE IN-LINE COLLISIONS**, John Daily and Nathan S. Shigemura; **ENERGY IN TRAFFIC CRASH RECONSTRUCTION**, Gary Cooper, Fricke Cooper Engineering; Southwestern Association of Technical Accident Investigators, Las Vegas, Nevada.
- 2003 **PHOTOGRAMMETRY**, Sgt. Jamie Maddux, Utah Highway Patrol; **FRICTION AND SKID TESTING**, Jim Delton, Arizona Department of Transportation; **NIGHTTIME VISIBILITY**, Rollin C. Bible, 3M Traffic Control Materials Division; **VISIBILITY AND THE INVESTIGATOR**, Bill Kiviat, Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2003 **PEDESTRIAN/CYCLIST CRASH INVESTIGATION**, Tony Becker; **THE INVESTIGATION OF AUTOMOBILE COLLISIONS WITH WOODEN UTILITY POLES AND TREES**, Joseph N. Cofone; **USING DELTA-V TO CALCULATE CLOSING VELOCITY AND IMPACT SPEED**, Rusty Haight, Southwestern Association of Technical Accident Investigators, Tucson, Arizona.
- 2002 **VEHICLE EXAMINATION FOR MECHANICAL DEFECTS**, Mark Salem, Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2002 **WORK ZONES - SET UP AND OPERATION**, Jeff Juetton; **INTELLIGENT TRANSPORTATION SYSTEMS**, Bruce Dressel, City of Scottsdale Transportation Department; **PROBLEMS ASSOCIATED WITH OBTAINING AND USING NHTSA CRASH TEST DATA**, Daniel Vomhoff III; **CALCULATING CRUSH STIFFNESS COEFFICIENTS AND THE AIR GAP PROBLEM**, Jim Neptune, Neptune Engineering, Inc., Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2001 **CRASH DATA RETRIEVAL VS. INSTRUMENTED VEHICLE CRASH DATA**, Dave King, McGinnis Engineering Associates; **DEVELOPMENTS IN SUPPLEMENTAL RESTRAINT TECHNOLOGY AND AIR BAG DEPLOYMENT**, Sam Massey, Supplemental Restraint Specialists, Inc.; **CRASH DATA RETRIEVAL AND GM BRAKE FAILURES**, Forrest Folck, Motor Vehicle Forensic Service, Southwestern Association of Technical Accident Investigators, San Diego, California.
- 2001 **ROLLOVER CRASH ANALYSIS**, Steve Warner, Exponent Failure Analysis; **ROLLOVER DYNAMICS**, Stein Husher, Keva Engineering; **CRASH SEVERITY ANALYSIS IN ACCIDENT RECONSTRUCTION : THE USE**

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- OF BEV AND DELTA V**, Michael Varat, Keva Engineering, Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 2001 **ACCIDENT RECONSTRUCTION TOPTEC: SPECIAL TOPICS**, Society of Automotive Engineers (SAE), Phoenix, Arizona. Topics included: **Measurements, Uncertainty and Reconstructions** - Raymond M. Brach, PhD, PE, University of Notre Dame; **Pedestrian Accident Reconstruction** - Thomas Fugger, PE, Accident Research; **Bicycle Accident Reconstruction** - Gerald Bretting, PE, **Collision and Injury Dynamics; Motorcycle Accident Reconstruction** - Stein E. Husher, KEVA Engineering; **Biomechanics and Motorcycle Accidents** - Terry Smith, PhD, Head Protection Research Laboratory; **Application Simulation Models in Collision Analysis** - Gregory Stephens, Research Engineer, Collision Research and Analysis; **Tire Forces** - Matthew Brach, PhD, PE, Exponent Corporation; **Offset/Override/Underride Collision Analysis** - Jeffrey Croteau, Exponent Corporation; **Force Deflection Modeling of Vehicle Crush** - Ronald Woolley, PhD, Woolley Engineering Research Corporation; **Barrier Equivalent Velocity Analysis in Accident Reconstruction** - Michael S. Varat, KEVA Engineering; **Heavy Truck Accident Reconstruction** - Tom Vadnais, PE, Vadnais, Wood & Rivers; **Restraint System Evidence for Accident Reconstruction** - Robert Banks, B.Eng., M.D., Biodynamic Research Corporation; **Human Factors in Accident Reconstruction** - Anthony C. Stein, PhD, Safety Research Associates, Inc.; **Crash Data Recorders** - Don Gilman, Vetronix Corporation; **Photogrammetry in Accident Reconstruction** - J. Rolly Kinney, Kinney Engineering and Stephen J. Fenton, Knott Laboratory, Inc.
- 2000 **NEW CAR ASSESSMENT PROGRAM (NCAP) AND VEHICLE CRASH RATING**, Brian Park, NHTSA NCAP program director; **CRASH DATA RETRIEVAL SYSTEMS (CDR)**, Mark Hall and James Kerr, Vetronix Corporation, Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 1999 **PEDESTRIAN ACCIDENT RECONSTRUCTION**, Jerry Eubanks; **BASIC SIGNAL TIMING FOR THE ACCIDENT INVESTIGATOR**, Daniel W. Vomhof III, 4N6XPRT Systems; **LOW-SPEED COLLISIONS**, Gene K. Baxter, Ph.D., P.E., Baxter Engineering; **EXPERT WITNESSES**, Stephen Craig, Assistant City Attorney, City of Phoenix, Southwestern Association of Technical Accident Investigators, San Diego, California.
- 1999 **ANTI-LOCK BRAKING SYSTEMS**, Dr. W. Wiley Garrett, National Transportation Safety Board, Washington, D.C.; **COMMERCIAL VEHICLE ACCIDENT INVESTIGATION**, Gary Van Etten, National Transportation Safety Board; **SLEEP DISORDERS AND AUTOMOBILE CRASHES**, Dr. James Kiley, National Director Department of Health and Human Services, Washington, D.C., Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 1998 **INJURIES AND AIR BAG DYNAMICS**, Dr. Richard Froede, Pinal County Medical Examiner's Office (retired); **OCCUPANT KINEMATICS**, Larry Cripe, Northeast Collision Analysis; **APPLIED AERODYNAMICS FOR THE TRAFFIC ACCIDENT INVESTIGATOR**, John Daily; **MOTORCYCLE ACCIDENT INVESTIGATION AND RECONSTRUCTION**, Neal Robar; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 1997 **HIGHWAY AND ROADWAY DESIGN**, Guy W. Winston III, P.E., Winston Engineering, Inc.; **EXPERT WITNESSES**, Mitch Rand, Maricopa County Attorney's Office Vehicular Crimes Unit; **CRUSH DAMAGE ANALYSIS (WinCRASH)**, Timothy A. Moebes, P.E.; **CLOSE-RANGE SOFTCOPY PHOTOGRAMMETRY IN ACCIDENT RECONSTRUCTION (PhotoWin35)**, Harry W. Townes, P.E. and Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 1997 **EXPERT WITNESSES**, Mark D. Zukowski and Donald L. Myles, Jr., JONES, SKELTON & HOCHULI and Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.
- 1996 **TRUCK BRAKING SYSTEMS AND SPEED CALCULATIONS**, Gary Van Etten, National Transportation Safety Board; **TIRE FORENSICS**, Dennis Carlson, Michelin Tires (retired); **COMPUTER AIDED ACCIDENT RECONSTRUCTION - WinSMAC**, Dr. Gordon W. Bigg, P.E, ARSoftware and Southwestern Association of Technical Accident Investigators, San Diego, California.
- 1996 **MOTORCYCLE ACCIDENT RECONSTRUCTION**, Paul Olson, Bellevue Police Department and Southwestern Association of Technical Accident Investigators.
- 1996 **INSTRUMENTED LOW SPEED IMPACT TESTING**, MacInnis Engineering; **LOW SPEED IMPACT RECONSTRUCTION**, Mark Bailey and David King, MacInnis Engineering; Southwestern Association of Technical Accident Investigators, Phoenix, Arizona.

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- 1996 **COMPUTER AIDED ACCIDENT RECONSTRUCTION USING PC-CRASH AND PC-RECT**, William Cliff and David King, MacInnis Engineering; **LOW SPEED IMPACT ANALYSIS AND CALCULATIONS**, Bill Morrison and David Elliott, W. M. Morrison & Associates; **HUMAN FACTORS**, Dr. Paul Olson and Southwestern Association of Technical Accident Investigators, Las Vegas, Nevada.
- 1995 **COMPUTER AIDED ACCIDENT RECONSTRUCTION - SLAM FOR WINDOWS**, Tim Moebes, P.E, ARSoftware; **TESTIFYING AS AN EXPERT WITNESS**, Philip Kolczynski, Esq.; **PERCEPTION OF HEADLAMPS: A PEDESTRIANS POINT OF VIEW**, William J. Ernyei, Vehicle Accident Investigation and Reconstruction, Inc.; **SEAT BELT DESIGNS AND AIRBAGS**, Tanya Rosenbluth, Automotive Consulting Services, Inc., and Southwestern Association of Technical Accident Investigators, San Diego, California.
- 1995 **LOW SPEED IMPACT TESTING WITH AND WITHOUT INSTRUMENTED OCCUPANTS**, Southwestern Association of Technical Accident Investigators, Phoenix, Arizona. Related seminar by Mark Bailey, MacInnis Engineering, regarding fundamentals of low speed rear end collisions and review and application of low speed rear end test data. Additional topics regarding biomechanics of low speed rear end impacts; Jeff Wheeler, Biomechanics Research and Consulting, and review of test data from instrumented occupant in a low speed rear end impact; Dr. Anil V. Khadilkar, Biodynamics Engineering, Inc.
- 1994 **CONTROLLED CRASH XIII**, Southwestern Association of Technical Accident Investigators, Phoenix, Arizona. Related seminar by Thad Aycock regarding vehicle crush profiles and application of deformation damage in accident reconstruction.
- 1994 **CONTROLLED CRASH XII**, Southwestern Association of Technical Accident Investigators, San Diego, California. Related seminars regarding reconstruction of the crash.
- 1993 **COMMERCIAL VEHICLE ACCIDENT RECONSTRUCTION**, Southwestern Association of Technical Accident Investigators.
- 1993 **CONTROLLED CRASH X**, Southwestern Association of Technical Accident Investigators. Related seminars regarding commercial vehicle accident reconstruction, site surveying and lamp analysis.
- 1991 **CONSERVATION OF ENERGY**, Gary Cooper, Northwestern Traffic Institute; **DRIVER FATIGUE**, Southwestern Association of Technical Accident Investigators; **CONTROLLED CRASH VIII AND MINI SEMINARS**, Southwestern Association of Technical Accident Investigators. Related seminar regarding driver perception and reaction.
- 1990 **COMPUTER AIDED ACCIDENT RECONSTRUCTION USING EDCRASH**, Terry Day, Engineering Dynamics Corporation; **CONTROLLED CRASH VII AND MINI SEMINARS**, Southwestern Association of Technical Accident Investigators.
- 1989 **MOTORCYCLE DYNAMICS, OCCUPANT RESTRAINT SYSTEMS, and CONTROLLED CRASH VI AND MINI SEMINARS**, Southwestern Association of Technical Accident Investigators.
- 1988 **OCCUPANT KINEMATICS, SEAT BELT ANALYSIS, and CONTROLLED CRASH V AND MINI SEMINARS**, Southwestern Association of Technical Accident Investigators.
- 1987 **TRAFFIC ACCIDENT RECONSTRUCTION**, Northwestern Traffic Institute.
- 1987 **ELEMENTS OF MOMENTUM**, Northwestern Traffic Institute and Southwestern Association of Technical Accident Investigators.
- 1987 **CONTROLLED CRASH IV AND MINI SEMINARS and SPECIAL PROBLEMS IN FRICTION EVALUATION**, Southwestern Association of Technical Accident Investigators.
- 1986 **KINETIC ENERGY AND DAMAGE, HUMAN FACTORS, RECONSTRUCTION OF CONTROLLED CRASH III, and CONTROLLED CRASH ANALYSIS III**, Failure Analysis and the Southwestern Association of Technical Accident Investigators.
- 1985 **VEHICLE DYNAMICS**, Northwestern Traffic Institute.

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- 1985 **MOTORCYCLE DYNAMICS, ACCIDENT PHOTOGRAPHY AND TECHNICAL DIAGRAMING, TRACTOR-TRAILER CRITICAL ITEM INSPECTION and CONTROLLED CRASH ANALYSIS II**, Failure Analysis and the Southwestern Association of Technical Accident Investigators.
- 1985 **TRAFFIC ACCIDENT INVESTIGATION**, in-service training, Arizona Department of Public Safety.
- 1984 **VEHICLE DYNAMICS (CRITICAL SPEED AND ACCELERATION TESTING), TRACTOR-TRAILER DYNAMICS AND BRAKING SYSTEMS, and CONTROLLED CRASH ANALYSIS I**, Northwestern Traffic Institute and Southwestern Association of Technical Accident Investigators.
- 1984 **TECHNICAL MOTOR VEHICLE TRAFFIC ACCIDENT INVESTIGATION**, Northwestern Traffic Institute.
1983 **QUALITATIVE VEHICLE DYNAMICS**, Northwestern Traffic Institute.
- 1983 **FRICTION EVALUATION AND TESTING**, Southwestern Association of Technical Accident Investigators.
- 1983 **TECHNICAL ACCIDENT INVESTIGATION**, University of North Florida, Institute of Police Traffic Management.
- 1982 **LAMP ANALYSIS**, Southwestern Association of Technical Accident Investigators.
1982 **ADVANCED ACCIDENT INVESTIGATION**, Phoenix College.
- 1981 **TRAFFIC ACCIDENT RECONSTRUCTION AND CAUSATION ANALYSIS**, Gallion Research and Training, California Highway Patrol Academy, Sacramento, California.
- 1981 **ADVANCED ACCIDENT INVESTIGATION**, Arizona Law Enforcement Officer's Advisory Council.
- 1980 **TRAFFIC ACCIDENT INVESTIGATION**, in-service training, Arizona Department of Public Safety.
- 1978 **ADVANCED ACCIDENT INVESTIGATION**, C.A.R.L.O.T.T.A, Casa Grande, Arizona.
- 1979 **ACCIDENT INVESTIGATION**, Arizona Department of Public Safety Academy.
- 1976 **ACCIDENT INVESTIGATION**, Phoenix Police Academy.