

GARY M BAKKEN, PhD, CPE
9390 North Calle Buena Vista
Tucson, Arizona 85704
Voice: (520) 882-5494
e-mail: asi@asi-az.com

EDUCATION

PhD Industrial Engineering (Human Factors/Ergonomics, Biomechanics). Texas Tech University. August, 1983.

MS Safety. Central Missouri State University. May, 1974.

BS Mechanical Engineering (Astronautical). Arizona State University. September, 1969.

EMPLOYMENT HISTORY

1981-Present **ANALYTICA SYSTEMS INTERNATIONAL, Inc.** Consultant to attorneys, insurance companies, business, industry, and academia on human factors/ergonomics, biomechanics, systems safety, systems engineering, and industrial engineering. President/Owner.

1990-1996 **ADVANTECH SOLUTIONS, Inc.** The design, development and manufacture of precision control air flow dampers. President/Owner.

1997-Present **UNIVERSITY OF ARIZONA.** Adjunct Associate Professor, College of Engineering, Systems and Industrial Engineering Department; Teaching human factors/ergonomics in systems design, including biomechanics and safety.

1979-1981 **UNIVERSITY OF ARIZONA.** Adjunct Assistant Professor, College of Engineering, Systems and Industrial Engineering Department and Medical Center, School of Health Related Professions. Human factors/ergonomics, biomechanics, safety, systems safety, product safety, physical exposures, work analysis, design, and measurement, production systems, engineering economics, research and curriculum development.

1976-1978 **TEXAS TECH UNIVERSITY.** Research Assistant. Funded research in human factors lab. Teaching. Consultant to Occupational Safety and Health Administration and Arizona Center for Occupational Safety and Health.

1974-1976 **3M COMPANY.** Senior Safety and Process Engineer. Responsible for safety, industrial hygiene and human factors activities at sixteen plant locations and for the start-up of multimillion dollar process addition. Responsible for manufacturing improvement of several product lines. Provided safety and human factors/ergonomics consultation to management, engineers, and scientists at the plant and corporate entities.

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1973-1974 **UNIVERSITY OF CENTRAL MISSOURI (CENTRAL MISSOURI STATE UNIVERSITY).**
Research Assistant. Safety research and teaching.

1965-1973 **UNITED STATES AIR FORCE.** Captain. Managed repair, maintenance and construction functions and projects. Implemented computerized management information program. Managed Industrial Engineering and Quality Control operations. Intelligence analyst.

Certified Professional Ergonomist (CPE) #322, 1993: Board of Certification in Professional Ergonomics (BCPE).

U.S. Citizen. Past security clearances included Top Secret-Crypto (NSA).

US PATENTS HELD

 #5,427,146 Linearly Adjustable Fluid Damper, granted June 27, 1995
 #5,218,998 Linearly Adjustable Damper, granted June 15, 1993

RESEARCH & PROJECTS

Work analysis, design, and measurement, Pima County Transportation - Traffic Department, March, 2015 to Present.

Forensic Human Factors/Ergonomics Issues Regarding Consumer Product Design. Publication Review and Editing. May, 2012.

Banner Behavioral Health, Coefficient of Friction Testing, February - March, 2011.

St Paul Fireman's Fund, Worksite Accommodation Assessment, Tucson, AZ, 2009

La Posada Healthcare, Work Accommodation Assessment, Green Valley, AZ, 2006 - 2007.

Walbro Engine Management, Workstation Ergonomic Assessment and Training, Tucson, AZ 2005

Arizona MEP, Core Technology Review of Research Integrations Inc. Dec, 2004 - Mar, 2005.

Brown & Caldwell, Workstation Ergonomic Assessment, Tucson, AZ 2005.

University of Arizona, McKale Center, COF Testing, Tucson, AZ 2003.

Research Integrations, Inc., Job Aid Task Order 3, Tempe, AZ 2002-2003.

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Research Integrations, Inc., Human Performance Considerations in Aircraft Flight Deck Certification and Design, Tempe, AZ 1998 to 2001.

Macton, Inc., COF Testing, Mercer Island, WA 2000.

Research Integrations, Inc., AATT Safety Analysis, Tempe, AZ 1998.

Metromedia Technologies, Inc. COF Testing of self-adhesive substrates. 1998.

Minnesota Technology, Inc. Assessment of technical and commercial aspects of integrated computer workstation. 1998.

Paul Revere Insurance Company. Ergonomic assessment for the purposes of identifying means to reduce or eliminate musculoskeletal stressors, particularly those related to CTS and UTS diagnoses. 1997.

Therapy Worx. Ergonomics Assessment for Mesa Fire Department; Mesa, AZ 1997.

Therapy Worx & GS Consulting. Ergonomics Back Program for Intel; Scottsdale, AZ 1997.

Samsonite. Ergonomics: Assessment of Selected Tasks, (with Tim Joganich); Tucson, AZ 1996.

Arizona Electric Power Cooperative, Inc. Cumulative Trauma Disorder Training Courses. Wilcox, AZ 1993.

AGM, Inc. Human Factors and Safety Product Design. Tucson, AZ 1992-1993; 1995.

Lighting Sciences Incorporated. Research and Development of Specification Techniques and Instrumentation for Realistic Decoys; Visualization, 1989-90.

Automated Printed Circuit Board Repair Facility. US Army Repair Depot, Sacramento, CA Program Management and Human Factors/Ergonomics and Safety Design Issues. 1987-88.

Hamersley Mining. Perth, Australia. Human Factors and Systems Safety in Mining. 1987-1988.

Durodyne, Inc. Human Factors and Systems Safety for design of F-15 & F-16 Decoys. 1987-1988.

Public Service Company of New Mexico (PNM). Human Factors in Fossil-Fired Power Plant Design, Operations and Maintenance. 1984-1985.

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Norwest Mortgage, Inc. The Identification, Evaluation, and Utilization of Human-Computer Interface Characteristics Pertinent to the Development of a User Instruction and Operational Manual for a Computerized Mortgage Origination and Processing System. 1984.

Texas Tech University. Ergonomic Lifting Task Capacity Determination as a Function of Task Variables. Dissertation Research. 1983.

John Klaasen Designs. Ergonomic Design Review: Computer Workstation Table Edge. 1983.

Burr-Brown Research Corporation. Work Definition and Evaluation for Manual Assembly of Circuit Boards. 1981-82.

Arizona Center for Occupational Safety and Health. Accident Control Workshop. Arizona Hospital Association, Southern Arizona Hospital Safety and Security. Tucson, AZ 1978.

Texas Tech University. Ergonomic Modeling of Lifting Capacity. NIOSH. 1976-78.

Texas Tech University. Design Study to Determine Methods for Establishing Ergonomic criteria for Assigning Personnel to Air Force Jobs Requiring Heavy/Very Heavy Work. U.S. Air Force. Research Assistant. 1975-78.

Texas Tech University. MIL-STD-1472B Revision. U.S. Navy. Research Assistant. 1977-78.

Texas Tech University. Ergonomic Analysis of Subpart D, Walking and Working Surfaces. U.S. Occupational Safety and Health Administration. Research Assistant. 1978.

Human Factors & Safety Issues in the Hospitality Industry: 1982 - Present.

Central Missouri State University. Biorhythms. Master's Thesis. 1974.

ACADEMIC DEGREE, PROJECT, REPORT ADVISEMENT

Doctoral Candidate committee member: Jennifer Lyall-Wilson. College of Engineering, University of Arizona, Tucson, Arizona, Spring 2007 - 2013.

Senior Capstone Project: Hand Held Tube Sealing Unit for Blood Banking. College of Engineering. University of Arizona. Tucson, Arizona. Design Mentor. Fall 2005-Spring 2006.

Senior Capstone Project: Ergonomic Sensor Chair. College of Engineering. University of Arizona. Tucson, Arizona. Design Mentor. Fall 2004 - Spring 2005.

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Smith, Sheena. A Systems Engineering Management Plan with an Application to the Heritage Roofing Company. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. July 2004.

Molin, Cindy. Does Synergy Equal Success? Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. March 2004.

Kalogreades, Stelios. User Centered Web Site Design Methodology. Senior Capstone project. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Advisor. May 2001.

Lugo-Delanoy, Edelmayra. Multi-objective Analysis of the Optimal Segmentation of Digital-to Analog Converters. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. 2000.

Marei, Khaled. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. 1999.

Castiano, Ellen. An Overview of Systems Safety. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Chair. 1980.

Abdulkader, Abdulla. Tactile Computer Manipulator. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. 1980.

Rosenberg, Jan. The Economics of Safety. Master's Report. Department of Finance - Safety Management. University of Arizona. Tucson, Arizona. Committee Chair. 1980.

Leonard, Banni. Manipulative Control Through Tactile Sensors. Master's Report. Department of Systems and Industrial Engineering. University of Arizona. Tucson, Arizona. Committee Member. 1980.

PUBLICATIONS

Bakken, Gary M. Book Review of *Human Factors in Lighting*, 2nd Edition, by Peter Boyce, for ASSE, Professional Safety. June, 2012.

G.M. Bakken, Jon R. Abele, H. Harvey Cohen. *Falls and Related Injuries: Slips, Trips, Missteps and their Consequences*. 2nd Edition, Tucson: L & J Publishing Company, January, 2007.

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Karwowski, Waldemar, G.M. Bakken contributing author. *Human Factors Issues in Product Liability: An Overview. Chapter Title: "Human-Centric Approach to Forensic Analysis for System Liability"*. New York: CRC Press, 2004.

Hyde, Alvin S., G.M. Bakken, Jon R. Abele, H. Harvey Cohen, Cindy A. LaRue. *Falls and Related Injuries: Slips, Trips, Missteps and their Consequences*. Tucson: L & J Publishing, June 2002.

Bakken, G.M. OSHA's Plan to Reduce Ergonomics Injuries. *Inside Tucson Business*, April 22-28, 2002.

Bakken, G.M. and Jon R. Abele. *Innkeeper's Liability Management*. Tucson: L & J Publishing, 1995.

Bakken, G.M. Human Factors/Ergonomics in Litigation. *Nevada Lawyer*, 1(3), March, 1993.

Garg, A., G.M. Bakken and U. Saxena. Effect of Restraint Type and Height on Functional Arm Reach. *The Journal of the Human Factors Society*, 24(3), June 1983.

Bakken, G.M. Case Technology Management: Key to Practice Productivity? Pima County Bar Association: *THE WRIT*, January, 1983.

Bakken, G.M. PI, Product Liability Litigants Examine Human Factors. Pima County Bar Association: *THE WRIT*, October, 1982.

Ayoub, M.M., A. Mital, G.M. Bakken, S.S. Asfour, and N.J. Bethea. Development of Strength and Capacity Norms for Manual Materials Handling Activities: State of the Art. *The Journal of the Human Factors Society*, 22(3), June 1980.

Ayoub, M.M. and G.M. Bakken. *An Ergonomic Analysis of Selected Sections in Subpart D Walking and Working Surfaces*, Report to the Occupational Safety and Health Administration. Washington, D.C. 1978.

Ayoub, M.M., N.J. Bethea, S. Deivanayagam, S. Panwalker, S.S. Asfour, G.M. Bakken, D. Liles, A. Mital, and M. Sherif. *Determination and Modeling of Lifting Capacity*. Report to NIOSH (DHEW). Cincinnati, OH. 1978.

Mital, A., M.M. Ayoub, S.S. Asfour, G.M. Bakken and N.J. Bethea, *Relationship between Lifting Capacity and Injury in Occupations Requiring Lifting*, 1978 Annual Human Factors Society Conference. Detroit, Michigan.

Bakken, G.M. *Establishing Criteria for Assigning Personnel to Air Force Jobs Requiring Heavy Work*. Texas Tech University, July 1978.

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Ayoub, M.M., S. Deivanayagum, and G.M. Bakken. *A Preliminary Manual for Selected Anthropometric, Strength and Endurance Measurements*. Texas Tech University. Lubbock, Texas. 1977.

Bakken, G.M. *Safety Manual: Coating Operations*. 3M Company. Brookings, SD. 1976.

Bakken, G.M. and R.J. Johnson. *Hazardous Spill Procedures*. 3M Company. Brookings, SD. 1976.

Bakken, G.M. *Safety Tips for Hoist Operations*. 3M Company. St. Paul, Minnesota. 1975.

COURSES TAUGHT

UA SIE 410A Human Factors and Ergonomics in Engineering & Design (2004 - Present)

UA SIE 511 Human Factors and Ergonomics in Engineering & Design II (1998 to 2003)

UA SIE 410 Human Factors and Ergonomics in Engineering & Design I (1997 to 2002)

UA SIE 411 Human Factors and Ergonomics in Engineering & Design II (1998 to 2003)

UA SIE 410 Industrial Ergonomics (1979-1981)

UA SIE 365 Engineering Economics (Developed: 1979-1981)

UA SIE 410 Work Analysis, Design and Measurement (1979-1981)

UA SIE 310 Human Factors in Engineering Design (1979-1981)

UA SIE 462 Production Systems Analysis (1979-1981)

UA OSH 410 Physical Exposures (Developed: 1979-1981)

UA OSH 486 Occupational Safety and Health (Product Safety, Developed: 1979-1981)

UA OSH 488 Applied Industrial Safety (System Safety - Developed: 1979-1981)

TTU Work Measurement and Design (1977)

CMSU Introduction to Safety (1974)

PROFESSIONAL & HONOR ORGANIZATIONS

Human Factors and Ergonomics Society (HFES)

International Ergonomics Association (IEA)

Board of Certification in Professional Ergonomics (BCPE)

International Systems Safety Society (ISSS)

American Society of Safety Engineers (ASSE)

American Society of Biomechanics (ASB)

International Council on Systems Engineering (INCOSE)

Institute of Industrial Engineers (IIE)

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Illuminating Engineering Society of North America (IES)
American Academy of Forensic Sciences (AAFS)
American Society for Testing and Materials (ASTM)
American National Standards Institute (ASTM)
Society of Automotive Engineers (SAE)

National Safety Council (NSC)
National Safety Council - Arizona Chapter
Alpha Pi Mu
Phi Kappa Phi
Sigma Xi

PROFESSIONAL ACTIVITIES

Human Factors and Ergonomics Society Member: 1974-Present.
Human Factors Standardization and Best Practices Working Group: 2005-Present National Forensic Technical Group Chairperson Elect: 1991-92.
National Forensic Technical Group Chairperson: 1992-93.
Arizona Chapter - Member: 1979-Present. Director: 1992-97. Secretary: 1996-2006. Director: 2007-2013.

American Society of Safety Engineers Professional Member: 1995-Present.

International Systems Safety Society Member: 1978-Present.
Arizona Chapter - Member: 1993-2005, Secretary/Treasurer: 1993-98. Saguaro Chapter, Member 2005-Present, Treasurer 2005-2013.

International Council on Systems Engineering Member: 1993-Present.
Southern Arizona Chapter - Member: 1993-Present. Secretary: 2013-2014.
Student Division Ambassador for University of Arizona, Systems and Industrial Engineering: 2013-Present.
Human Systems Integration Working Group: 2011 - Present
Enterprise Systems Working Group: 2015 - Present
Systems Engineering Requirements Committee Chair: 1994. Human Factors Task Force: 1993-1998.

American Society of Biomechanics Member: 1987-Present

Institute of Industrial Engineers Member: 1976-Present.
Southern Arizona Chapter - Member: 1979-1997. President-Elect: 1983-1984. Treasurer: 1982-83. Board Member: 1981-1982. Secretary: 1980-81.

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Central Arizona Chapter - Member: 1997-Present.

University of Arizona Student Chapter Organizing Committee for Institute of Industrial Engineers Faculty Advisor: 1979-1980.

American Society for Testing and Materials Member and subcommittee member: 1999Present

American National Standards Institute Voting member for various subcommittees:
2002Present

National Floor Safety Institute B101.3 Committee Member: 2013-Present

Pima Community College

Industrial Safety Program Advisory Committee, Tucson, AZ: 1979-1980.

School of Health Related Professions, University of Arizona, Tucson, AZ

Instructional Improvement Committee: 1979-1980.

Admissions Committee: 1979-1980.

Department of OSH Program Admissions Committee: 1979-1980.

Arizona Center for Occupational Safety and Health Continuing Education Steering Committee, University of Arizona, Tucson, AZ: 1979-1980.

Public service consultations with local industrial and public organizations regarding industrial engineering and safety issues.

PRESENTATIONS

Human Centric Systems Design. Southern Arizona Chapter of the American Society of Safety Engineer. Tucson, AZ, October 18, 2016.

A Comprehensive Approach to Slip, Trip, and Fall Claims. The National Institute of Forensic Studies, a Division of Impact General, Inc. Newport Beach, CA, October 11, 2012.

Human Factors/Ergonomics and Systems Safety. Saguaro Chapter of the Systems Safety Society, April, 2010.

Human Factors and Ergonomics in Design. Semiconductor Environmental Safety and Health Association (SESHA) / Centre for Research, Education and Training in Energy (CREATE) Miniconference on Emerging Technologies and Issues, Chandler, AZ, Oct 31-Nov 1, 2005.

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Nursing Home Litigation Seminar for Lawyers & Judges, Tucson, AZ. November 15 and 16, 2002.

Human Factors/Ergonomics in Accident Reconstruction Seminar for Southwestern Association of Technical Accident Investigators, Inc., Las Vegas, NV. March 4, 2002.

Human Factors in Litigation Seminar for Tucson Legal Support Association, Tucson, AZ. July 19, 2001.

Aging, Perception and Reaction, Traffic Accident Reconstruction & Litigation Seminar for Lawyers & Judges Publishing Company, Tucson, AZ. Nov. 6-7, 1998.

Applied Ergonomics Southwest Safety Congress & Exposition: Safety 2001: Tools for Success; Arizona Chapter National Safety Council, Phoenix, AZ. May 29, 1997.

Human Factors, Safety in Design Seminar for Albanese Brooks Architects, Tucson, AZ. May 1997.

Slips, Trips, Missteps & Falls Seminar for Southern Arizona Chapter of American Industrial Hygiene Association, Tucson, AZ. May 1997.

Slips, Trips, Missteps & Falls Seminar for City of Tucson, AZ. April 1997.

Human Factors in Litigation Seminar for Western Forensic Engineers & Scientists. Tucson, AZ. 1996.

Human Factors in Litigation Seminar for Southern Arizona Trial Lawyers Association. Tucson, AZ. 1992.

Human Factors in Litigation Seminar for Southern Arizona Defense Bar Association. Tucson, AZ. 1991.

Human Factors in Litigation Seminar for Southern Arizona Trial Lawyers Association. Tucson, AZ. 1989.

Human Factors & The Legal Investigator Seminar for National Association of Investigators, Inc. Region Six Seminar. Tucson, AZ. 1989.

Human Factors & Systems Safety Seminars for Hamersley Mining Company. Perth, Australia. 1987-1988.

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Human Factors in the Design, Operations and Maintenance of A Fossil-Fueled Power Generating Plant Seminar for Public Service Company of New Mexico. 1985.

Human Factors for the Industrial Hygienist Seminar for University of Arizona. 1985.

Decision-Making and Operations Research Techniques Seminar for University of Phoenix. 1982.

Materials Handling Seminar for IBM General Products Division. Tucson, AZ. 1981.

Human Factors in Management Information Systems Seminar for University of Arizona. Tucson, AZ. 1980.

Manual Materials Handling Seminar for University of Arizona. Tucson, AZ. 1979.

Toxicology and the Engineer Seminar for University of Arizona. Tucson, AZ. 1979.

Human Factors Research Seminar for University of Arizona. Tucson, AZ. 1979.

Human Factors/Ergonomics in Equipment Design Seminar for Technical Session of Southwest Safety Congress. Tucson, Arizona. March, 1979.

Development of Technological Humanists Seminar for Virginia Polytechnic Institute and State University. Blacksburg, Virginia. 1978.

Development of Technological Humanists Seminar for University of Miami. Coral Gables, Florida. 1978.

Development of Technological Humanists Seminar for University of Arizona. Tucson, AZ. 1978.

Development of Technological Humanists Seminar for University of Texas. Arlington, Texas. 1978.

Human Motion and Behavior Simulation Seminar for Texas Tech University. Lubbock, Texas. 1978.

WORKSHOPS & SEMINARS ATTENDED

Sensors for Safety, Efficiency, & Productivity. Technical Webcast Series from the editors of Society of Automotive Engineers. October 16, 2014.

The Human Factor: A Problem to Control or a Resource to Harness? Human Factors and Ergonomics Society Webinar presented by Sidney Dekker. September 2, 2014.

October 18, 2016

Prevention Through Design. The American Society of Safety Engineers. Chicago, IL. February 21-22, 2013.

A Comprehensive Approach to Slip, Trip, and Fall Claims. The National Institute of Forensic Studies, a Division of Impact General, Inc. Newport Beach, CA, October 11, 2012.

Fleet Safety: How to Reduce Risk, Including Cost, Injuries, Crashes and Fatalities. NETS: Network of Employers for Traffic Safety. Jhanley@trafficsafety.org, www.trafficsafety.org. 2010

Workshop on Environmental Stress & Cognition. On-line Workshop sponsored by New Mexico State University, 2005-2006.

Multiple Mental Spaces. Cognitive Science Society Webinar with Barbara Tversky of Stanford University, February 25, 2005.

How Our Hands Help Us Think. Cognitive Science Society Webinar with Susan Goldin-Meadow, February 11, 2005.

The Present and Future of Work. Groove Networks Webcast, May 20, 2004.

Embodiment and Ecological Control. Cognitive Science Society Webinar, April 9, 2004.

Analogical Learning. Cognitive Science Society Webinar with Dedre Gentner, March 5, 2004.

Cognitive Principles of Interactivity and Design. Cognitive Science Society Webinar with David Kirsch, December 5, 2003.

Committee F13 Meeting and Workshop on Safety and Traction for Footwear. ASTM International, Pasadena, CA. June 27 - 28, 2003.

Lighting for The Aging Eye. Illumination Engineering Society of North America, April, 2003.

Solution Envisioning for Ontology-Based Applications. Top Quadrant Webinar, February, 2003.

Cognitive Task Analysis to System Design: Cognitive Task Analysis for Teams. CTA Resource online seminar, October 2002.

Cognitive Task Analysis to System Design: Designing to Support Situation Awareness. CTA Resource online seminar, September 2002.

The Unified Modeling Language and a Unified Systems Engineering Process. University of Arizona, Tucson, AZ, September 2002.

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English XL VIT Certification Program. International Safety Academy, Tampa, FL, April, 2002.

Accidental Injury: Biomechanics & Prevention. University of California School of Medicine, La Jolla, CA, 1999.

Traffic Accident Reconstruction & Litigation, L & J Publishing, Tucson, AZ, November 6-7, 1998.

Human Performance Considerations in Aircraft Flight Deck Certification and Design, FAA/JAA sponsored international workshop, Chandler, AZ, February, 1998.

Are You Prepared for the ADA? O'Connor, Cavanagh, Anderson, Westover, Killingsworth & Beshears, Tucson, AZ, 1992.

Accidental Injury: Biomechanics and Prevention. Medi/Legal Institute, San Diego, CA, 1991.

Human Factors in Playground Design. Human Factors Society, Tucson, AZ, 1990.

Lighting and Its Effect in Our Daily Life. Illuminating Engineering Society, Tucson, AZ, 1990.

Biomechanics of Injury in Motor Vehicle Accidents. Medi/Legal Institute, San Diego, CA, 1989.