



Raina J. Shah, M.S.E., C.P.S.M., CPE

Principal Consultant

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Background

Ms. Raina Shah is a Principal Consultant in the Human Factors group and directs chemical risk communication activities. She has extensive experience in litigation matters related to chemical hazard communication, occupational health and safety, and consumer product safety and warnings. Her activities have included researching user response to warnings and instructions; evaluating product safety information in consumer, medical, recreational, retail, and occupational contexts; analyzing product and occupational accidents and premises safety issues; and providing general safety and human factors consultation.

Ms. Shah has played an active role in national standards for consumer product warnings and instructions (ANSI Z535), chemical labeling (ANSI Z129.1), and material safety data sheets (ANSI Z400.1), and she has regularly guest lectured at the University of Michigan on topics including hazard communication, driver distraction, and uncertain health and safety risks.

Ms. Shah holds a master's degree in Industrial and Operations Engineering from the University of Michigan. She also holds two bachelor's degrees from the University of Michigan, one in Psychology and another in Industrial and Operations Engineering. While at the University of Michigan, Ms. Shah assisted with research at the University of Michigan Center for Ergonomics in the area of biomechanics and human motion simulation. She also worked in the Human Factors Division of the University of Michigan Transportation Research Institute, where she studied human factors issues related to the design of driver interfaces.

Standards Committee Membership

- American National Standards Institute (ANSI), **Z535.4 Subcommittee on Product Safety Signs and Labels** (2004 to Present).
- American National Standards Institute (ANSI), **Z535.6 Subcommittee on Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials** (c. 2009 - 2011).

Professional Experience

- **Rimkus** **2021 – Present**

 - Principal Consultant
 - Provide safety and human factors consultation, including the development and evaluation of hazard communications, analysis of standards and regulations, and analysis and investigation of product and occupational accidents. Research user response to warnings and instructions. Participate in the development of consensus standards (e.g., ANSI Z535.4, ANSI Z129.1).

- **Applied Safety and Ergonomics, Inc.** **2000 – 2021**

 - Senior Consultant
 - Provide safety and human factors consultation, including the development and evaluation of hazard communications, analysis of standards and regulations, and analysis and investigation of product and occupational accidents. Research user response to warnings and instructions. Participate in the development of consensus standards (e.g., ANSI Z535.4, ANSI Z129.1).

- **University of Michigan, Center for Ergonomics** **1999 – 1999**

 - Research Appointment
 - Assisted in the implementation of a human motion simulation study. Collected and analyzed data through the use of a human motion tracking system.

- **University of Michigan Transportation Research Institute (UMTRI)** **1998 – 1999**

 - Research Appointment
 - Assisted with human factors research related to driver-vehicle interfaces. Authored and edited technical reports and literature reviews.

Teaching Activities

- **University of Michigan Guest Lectures**

 - Department of Industrial and Operations Engineering, Safety Management (IOE 438)
 - Hazard Communication, 2006, 2007, 2008, 2009, 2010, 2013, 2014, 2015, 2017, 2022, 2023, 2024
 - Behavioral Responses to Safety Interventions, 2012
 - Human Factors and Driver Distraction, 2011, 2012
 - Warning about Uncertain Health Risks in Consumer Products, 2011
 - Department of Psychology, Decision Consortium Seminar
 - Public Acceptance of Safety Policies: Exploring the Role of Perceived Risk Using Data on Drinking and Driving, 2016.
 - Risk Communication and Public Health: Decision-Making at the Government, Manufacturer, and Consumer Levels, 2014.
 - Warning about Uncertain Health Risks in Consumer Products, 2008.

- **Society for Chemical Hazard Communication Continuing Education Course Instruction**

 - Advanced Topics in EHS: Human Factors in Hazard Communication for Consumer and Occupational Settings, April 2012, September 2013, April 2016, September 2017.

- **University of Wisconsin Continuing Education**

 - Human Factors Considerations for Product Design, Maintenance, and Accident Investigation. University of Wisconsin 27th Annual Product Liability Conference. September 22, 2015. Madison, Wisconsin.

- Hazard Communication for Globally Distributed Products. University of Wisconsin 21st Annual Product Liability Conference. September 24, 2009. Madison, Wisconsin.

- **Additional Continuing Education Lectures**

- Product Safety Information in Labels and Product Publications: Background and Application of ANSI Z535.4 and Z535.6. Goodden & Ross Annual Product Safety and Liability Conference, July 24, 2008, Milwaukee, Wisconsin.
- Warning! The Rules are Changing: Implementing ANSI Z535.6 in Owners Manuals. Association of Equipment Manufacturers (AEM) Product Safety Seminar, April 21-23, 2008. Dallas, Texas.

Education

- **M.S.E. Industrial and Operations Engineering**, University of Michigan, Ann Arbor (2004)
- **B.S.E. Industrial and Operations Engineering**, University of Michigan, Ann Arbor (1999)
- **B.A. Psychology**, University of Michigan, Ann Arbor (1999)

Certifications

- **Certified Product Safety Manager (C.P.S.M.)**
- **Certified Professional Ergonomist (CPE)**

Professional Affiliations

- **Human Factors and Ergonomics Society**, Member
- **Society for Chemical Hazard Communication**, Member
- **American Industrial Hygiene Association**, Member
- **International Consumer Product Health and Safety Organization**, Member
- **International Society for Occupational Ergonomics and Safety**, Member

Publications, Technical Reports, and Posters

- Hickman, J.S., Shah, R., Soccolich, S. Hammond, R., and Jupe, J. (2024). **Cell phone conversations while driving a heavy vehicle: risk as a function of event type**. In Proceedings of the 9th International Conference on Driver Distraction and Inattention, pp. 74-77.
- Hall, S.M., Isaacson, J.J., Shah, R.J., Ward, A.C., and Frantz, J. (2024). **Consumer expectations for owner's manuals—safety information & online availability**. Poster presentation at the 2024 International Consumer Product Health and Safety Organization (ICPHSO) Annual Meeting and Training Symposium, Orlando, Florida, February 19-22, 2024.
- Shah, R.J., Faust, K.R., Khan, F.S., and Darnell, K.R. (2022). **Product labeling challenges arise when frameworks conflict: human factors considerations illustrated through recent glyphosate developments**. Poster presentation at the Society for Chemical Hazard Communication 2022 Annual Meeting. Arlington, VA. September 20, 2022.
- Hall, S.M., Isaacson, J.J., Shah, R.J., and Ward, A.C. (2022). **Consumer expectations for owner's manuals—safety information & online availability**. Poster presentation at the 13th International Conference on Applied Human Factors and Ergonomics. New York, NY. July 27, 2022.
- Shah, R.J. and Grieser, B.C. (2019). **Human factors and safety perspectives on the evolving rules for use of dockless e-scooters**. Poster presentation at the 10th International Conference on Applied Human Factors and Ergonomics. Washington, D.C. July 26, 2019.

- Shah, R.J., Hall, S.M., and Faust, K.R. (2019). **Recent approaches to communicating information about per- and polyfluoroalkyl substances (PFAS)**. Poster presentation at the Society for Chemical Hazard Communication Spring Meeting. Las Vegas, Nevada. March 19, 2019.
- Shah, R.J., Burhans, C.G., Wise, M.J., Frantz, J.P., and Rhoades, T.P. (2016). **Exploring the relationship between risk perception and U.S. driver acceptance of a 0.05% BAC limit**. In Proceedings of the Human Factors and Ergonomics Society 60th Annual Meeting, pp. 1659-1663.
- Shah, R.J., Hall, S.M., and Diebol, J.K. (2016). **Contextual Considerations for the Development and Assessment of Product Warnings**. Proceedings of the XXVIIIth Annual Occupational Ergonomics and Safety Conference, pp. 120-125.
- Burhans, C.G., Frantz, J.P., Rhoades, T.P., Shah, R.J., and Wise, M.J. (2015). **Alcohol, Everyday Activities, and Recognizing the Risk of a Few Drinks**. In Proceedings of the Human Factors and Ergonomics Society 59th Annual Meeting, pp. 1596-1600. Santa Monica, CA: HFES.
- Shah, R.J., Hall, S.M., and Diebol, J.K. (2015). **U.S. adoption of GHS creates unresolved challenges for consumer and occupational labeling practices**. Poster presentation at the Society for Chemical Hazard Communication Spring Meeting. San Francisco, California. March 17, 2015.
- Frantz, J.P., Rhoades, T.P., Wise, M.J., Burhans, C.G., Shah, R.J., and Hall, S.M. (2013). **The Effect of Observer Goals on Noticing Static Environmental Features and a Dynamic Character in the Field of View**. Proceedings of the XXV Annual Occupational Ergonomics and Safety Conference, pp. 202-207.
- Hall, S.M., Isaacson, J.J., Burhans, C.G., Frantz, J.P., Rhoades, T.P., Shah, R.J., and Young, S.L. (2012). **New Editions of ANSI Standards for Warnings**. In Proceedings of the 2012 IEEE International Symposium on Product Compliance Engineering (ISPCE 2012), pp. 1-4. doi: 10.1109/ISPCE.2012.6398290.
- Rhoades, T.P., Fuller, H.J.A., Shah, R.J., and Young, S.L. (2012). **Human Factors Perspectives on Driver Inattention**. Prosecuting or Defending a Trucking or Auto Accident Case 2012, November 15-16, San Antonio, TX. Austin, TX: State Bar of Texas, Texas Bar CLE.
- Shah, R.J., and Diebol, J.K. (2012). **Global approaches to communicating information about nanomaterials in consumer products**. Poster Presentation. 2012 Spring Meeting for the Society for Chemical Hazard Communication (SCHC). April 3, 2012. Nashville, Tennessee.
- Rhoades, T.P., Frantz, J.P., Young, S.L., Shah, R.J., Fuller, H.J.A., Burhans, C.B., and Hall, S.M. (2011). **Human factors perspectives on driver inattention and traffic safety**. 2011 Emerging Issues in Motor Vehicle Liability Litigation, March 30-April 1, Phoenix, AZ. Chicago, IL: American Bar Association [CD-ROM].
- Frantz, J.P., Young, S.L., Shah, R.J., Rhoades, T.P., Adams, P.S., and Burhans, C.G. (2008). **Predicting the Effects of Task Objectives on Attention to Conspicuous Visual Stimuli: Implications for Industrial Warnings and Accident Investigation**. Proceedings of the XX Annual International Society for Occupational Ergonomics and Safety, pp. 36-41.
- Young, S.L., Adams, P.S., and Shah, R.J. (2008). **Role of Warnings in Industrial Accident Prevention**. Proceedings of the XX Annual International Society for Occupational Ergonomics and Safety, pp. 1-4.
- Diebol, J.K., Darnell, K.R., Faust, K.R., and Shah, R.J. (2008). **Early MSDSs: Regulation Before OSHA's Hazard Communication Standard**. Poster Presentation. 2008 Spring Meeting for the Society for Chemical Hazard Communication (SCHC). April 8, 2008. Atlanta, Georgia.
- Young, S.L., Frantz, J.P., Shah, R.J., Rhoades, T.P., and Diebol, J.K. (2007). **Perceptions and use of product-related age recommendations: A case study involving ATVs**. Human Factors and Ergonomics Society 51st Annual Meeting, pp. 30-34.
- Frantz, J.P., Rhoades, T.P., Young, S.L., Diebol, J.K., and Shah, R.J. (2007). **Exploring parental response to age-related warnings**. Human Factors and Ergonomics Society 51st Annual Meeting, pp. 1378-1382.

- Shaver, E.F., Young, S.L., Frantz, J.P., Rhoades, T.P., Hall, S.M., and Shah, R.J. (2006). **Comparison of ANSI and ISO standard formats on people's response to product warnings.** Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting, pp. 2197-2201. Santa Monica, CA: HFES.
- Frantz, J.P., Rhoades, T.P., Shah, R.J., Hall, S.M., Isaacson, J.J., and Burhans, C.G. (2005). **ANSI Z535 signal words and the ability to infer hazard and consequence information — 1992 versus 2004.** Proceedings of the Human Factors and Ergonomics Society 49th Annual Meeting, pp. 1790-1794.
- Young, S.L., Shah, R.J., Frantz, J.P., and Rhoades, T.P. (2004). **Exploring the effects of message length, location, repeated exposure, and user evaluation on response to warnings and instructions.** Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting, pp. 2055-2059. Santa Monica, CA: The Human Factors and Ergonomics Society.
- Grieser, B.C., Rhoades, T.P., and Shah, R.J. (2002). **Slip Resistance: Field Measurements Using Two Modern Slipmeters, Professional Safety.** Des Plaines, IL: American Society of Safety Engineers.
- Yoo, H., Tsimhoni, O., Watanabe, H., Green, P., and Shah, R. (1999). **Display of HUD Warnings to Drivers: Determining an Optimal Location (Technical Report UMTRI-99-9),** Ann Arbor, MI: University of Michigan Transportation Research Institute.
- Shah, R., Nowakowski, C., and Green, P. (1998). **U.S. Highway Attributes Relevant to Lane Tracking (Technical Report UMTRI-98-34),** Ann Arbor, MI: University of Michigan Transportation Research Institute.

Selected Peer Review and Professional Association Activities

- **Executive Committee (Secretary),** International Society for Occupational Ergonomics and Safety (2024-present).
- **Panelist,** International Consumer Product Health and Safety Organization 2024 Annual Meeting. *Toxicological, chemical, and human factors/risk communication perspectives on the rapidly evolving PFAS landscape.*
- **Keynote Speaker,** International Society for Occupational Ergonomics and Safety XXXIV Annual Meeting. *Context matters: contextual considerations for applying workplace health and safety frameworks.*
- **Proposal Reviewer,** Human Factors and Ergonomics Society Annual Meeting.
- **Manuscript Reviewer,** International Journal of Industrial Ergonomics.
- **Chapter Reviewer,** Critical Issues Impacting Science, Technology, Society (STS) and Our Future, Lum, H. (Ed.) (2019). IGI Global.
- **Conference Session Chair,** Human Factors and Ergonomics Society Annual Meeting.
- **Exam Question Contributor,** Board of Certified Professional Ergonomists (BCPE).

Selected Continuing Education Activities

- **Northwestern University:** Advanced Crash Reconstruction Utilizing Human Factors Research, May 2015
- **UL:** Conducting a Validation Usability Test, August 2013
- **Society for Chemical Hazard Communication, Advanced Topics in EHS:** Toxicology of Nanomaterials, October 2010
- **Society for Chemical Hazard Communication:** REACH Understanding and Preparing for Chemical Registration in Europe, September 2007; Labeling Workshop: Overview of Requirements and Practical Examples in Label Preparation, October 2004; Globally Harmonized System for Classification & Labeling of Chemicals, October 2004