**M. M. Mumtaz, M. Sc., M.S., Ph. D., FATS CURRICULUM VITAE**

**Office of the Associate Director for Science (OADS) E-mail: mgm4@cdc.gov**

**Agency for Toxic Substances and Disease Registry (ATSDR) Phone:**

**(770) 488-3349**

**Centers for Disease Control and Prevention (CDC)**

**1600 Clifton Road, S102-2, Atlanta GA 30333, USA**

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**EDUCATIONAL**

**QUALIFICATIONS:**

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| 1984 - 1987 Post-doctoral Fellow, University of Texas Medical Branch, Galveston, TX (Occupational Health). | Effect of occupational chemical exposures on worker health |
| 1981 – 1984 Ph.D., University of Maryland, College Park, MD. (Toxicology/Entomology) | Thesis: “Comparative Metabolism and Fate of Fenvalerate in Japanese Quail (*coturnix coturnix japonica*) and Rats (*rattus norwegicus*)”. |
| 1974 – 1976 M.S. Oregon State University, Corvallis, OR. (Analytical Chemistry/Entomology).  1973 – 1971 M.Sc. Osmania University, Hyderabad, A.P., India. (Analytical Chemistry). | Pheromonal communication in the western cherry fruit fly (rhegoletis indifferens curran) with particular reference to oviposition.  Methods development for organic synthesis and identification of inorganic chemicals and reagents. |
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**PROFESSIONAL EXPERIENCE:**

**2019 to**

**Present:**  **Science Advisor** Office of the Associate Director for Science, (OADS), Office of the Associate Director (OAD) Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, 1600 Clifton Road, (MS S102-2), Atlanta, GA 30333.

Provides overall leadership in health-related activities for hazardous substances found at waste sites; provides overall coordination for the research programs and science policies of the agencies; develops goals and objectives and provides leadership, policy formulation, and scientific oversight in program planning and development; maintains liaison with other Federal, State, and local agencies, institutions, organizations, and the private sector; coordinates ATSDR program activities with other CDC components; coordinates interagency workgroups/committees represents ATSDR on various CDC/ATSDR committees, work groups, and task forces, such as the CDC/ATSDR Office of the Chief Science Officer’s Excellence in Science Committee.

**2005 to**

**2019:**  **Science Advisor** Computational Toxicology Laboratory, Division of Toxicology and Human Health Sciences (DTHHS), Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, 1600 Clifton Road, (MS S102-2), Atlanta, GA 30333.

I serve as Science Advisor and provide scientific expertise/guidance to the program activities, Office of the Director and Division of Toxicology and Human Health Sciences. Provide technical support to community concerns, emergency response and extramural programs. Provide scientific leadership through coordinated activities and collaborative research across NCEH/ATSDR divisions, U S federal agencies, and international organizations. Coordinate agency activities with respect to the document clearance process, and reviews to assure the standards required for the protection of the rights and welfare of participants in ATSDR/CDC sponsored research. Develop vision-based research strategies that integrate innovative methods and use credible science. Organize and/or chair Scientific Panels, Task Forces, or Workgroups to develop consensus in implementation of methods and policies regarding chemical exposures and health impact assessment. Work closely with stakeholders and partners such as the World Health Organization (WHO), Organization for Economic Cooperation and Development (OECD), U.S. Environmental Protection Agency (EPA), National Institute of Environmental Health Sciences (NIEHS), National Institute for Occupational Safety and Health (NIOSH), and National Academy of Sciences (NAS). Develop and maintain effective work relationships with risk assessment community, agencies and organizations. Provide technical and scientific advice and assistance in specialized fields regarding the toxicology of emerging environmental contaminants such as PFAS that may pose a threat to human health. Publish findings in peer-reviewed reputed national and international journals. Contribute to Agency reports including Toxicological profiles, reports to the U.S. Congress and other such high profile documents.

**Professor (Adjunct)**, Department of Environmental Health, Rollins School of Public Health, Emory University, Atlanta, GA 30322.

Mentor and counsel graduate students of the Department of Environment Health. Teach graduate and advance students EOH 500 & 524 courses in principles of risk assessment and the issues that play a role in the potential health effects of environmental chemicals and their mixtures. Highlight the advances and the use of computational tools in exposure and toxicity assessment. Teach a course for MPH in Environmental Health students. Teaching objectives include (1) environmental and occupational exposures to chemicals, radiations, and other stressors. (2) Environmental risk assessment calculations. (3) Uncertainty and variability analyses, and (4) Communication of the results and quality of risk

**Senior Toxicologist**, Office of the Director, Environmental Toxicology Branch, Division of Toxicology and Environmental Medicine (DTEM), Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, Atlanta, GA 30333.

Develop, implement, and coordinate programs to help determine the health effects of chemicals and substances found in the environment to establish their significant human exposure levels. Deal with the most complex operational issues involving public health policy and develop guidance to improve public health through the development of risk evaluation/assessment methods. Develop and compare methods, make them accessible, increase their awareness and ease of implementation. Work with grants and budget personnel and CDC procurement office staff to negotiate cooperative/interagency agreements, contracts and grants with federal and academic institutions. Work closely with national and international agencies such as the U.S. Environmental Protection Agency (EPA), National Institute of Environmental Health Sciences (NIEHS), National Institute for Occupational Safety and Health (NIOSH), Identify current research trends and initiatives in toxicology to determine innovative strategies for filling identified data needs using computational methods such as use of structure activity relationships, physiologically based pharmacokinetic modeling and short term toxicity testing methods.

1992 to

2005: **Toxicologist**, Research Implementation Branch, Division of Toxicology (DT), Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, U.S. Public Health Service, Atlanta, GA 30333.

Develop good rapport and working relationships with senior staff including the deputy directors of other offices and divisions of ATSDR/NCEH. Coordinate ATSDR-wide activities providing professional/scientific leadership. Develop strategies, experimental design protocols, data mining, analyses and interpretation for assessment of impact of chemical exposure on public health through development of computational tools. Direct multiple research projects at universities and national and international entities such as the U.S. EPA, the Dutch Toxicology and Nutrition Office (TNO), Health Canada and the Health Council of the Netherlands (HCN). Provide technical and scientific advice and assistance regarding the toxicology of environmental contaminants that may pose a threat to human health. Serve as consultant and provide leadership in the field of toxicological methods development through presentations of findings at national and international meetings. Publish findings in peer-reviewed reputed national and international journals.

1987 to

1992: **Toxicologist and Team leader**, Chemical Mixtures Assessment Branch, Environmental Criteria and Assessment Office, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, OH.

Serve as a Team/Group leader and coordinator of research supported by the Superfund Program. Ensure coordinated and uniform development of innovative methods for risk assessment of single and multiple chemicals through integration of various ongoing research projects. Interact with Superfund and other EPA Program Offices to ensure their needs are addressed. Maintain liaison between ECAO, OHEA and OHR scientists in order to incorporate current or new research findings in the development of state-of-the-science risk assessment methods. Solicit, evaluate and recommend extramural research grants for federal financial support. Provide technical support to management team on intermedia and other risk assessment issues involving toxicity and health impact assessment. Present a unified approach to the resolution of risk assessment problems. Responsible for planning, reviewing and evaluating risk assessment documents ensuring accuracy and adequacy of scientific information.

**GRANTS and**

**COOPERATIVE AGREEMENTS:**

Program for research and development of methods for the joint toxicity assessment of environmental mixtures. Notice of availability of funds. Agency for Toxic Substances and Disease Registry: Federal Register 67: FR 41236, June 17, 2002.

Thimerosal pharmacokinetics: Assessment of the distribution, metabolism, and excretion. Availability of funds. Agency for Toxic Substances and Disease Registry: Federal Register 66: FR 34203, June 27, 2001.

Cooperative agreement for a research program to study the dermal toxicokinetics of methyl parathion. Notice of availability of funds. Agency for Toxic Substances and Disease Registry: Federal Register 63: FR 45067, August 24, 1998.

Cooperative agreement for a research program for Methyl Tertiary Butyl Ether (MTBE). ATSDR under Public Health Service Grant No. U50rATU980088-01-1. 1997.

Research programs for the development of methods for the joint toxic interactions for chemical mixtures. Notice of availability of funds. Agency for Toxic Substances and Disease Registry: Federal Register 62: FR 30865, June 5, 1997.

A research program on the public health assessment of toxic interactions for chemical mixtures. Notice of availability of funds. Agency for Toxic Substances and Disease Registry: Federal Register 59: FR 41764, August 15, 1994.

**MEMBERSHIP**

**PROFESSIONAL**

**SOCIETIES:**

Academy of Toxicological Sciences

Society of Toxicology

American College of Toxicology

The American Society for Mass Spectrometry

American Chemical Society - Pesticide Chemistry Division

Association of Government Toxicologists

American Society Experimental Therapeutics

Association of State and Territorial Risk Assessors

**MENTORSHIP:**

(Recent)

**Georgia Tech Research Institute (GTRI), Georgia Tech University**

2022 Nithya Jameshenry, Hector Pulido

**Georgia Tech Research Institute (GTRI), Georgia Tech University**

2021 Hannah Snyder, Ryan Kann, Taraji Long

**Oak Ridge Institute of Science and Education (ORISE) Research Program**

2019 Michael Hussey

**Emory’s Rollins Earn and Learn Program**

2017 Michael Hussey

**Collegiate Leaders in Environmental Health (CLEH) Program**

2015 Rohin Aggarwal; Asia Wang

2016 Nate Stanley,

2011 Danielle Blemur; Jennifer Kim

**Graduate Environmental Health (GEH) Intern program**

2016 Gillian Capper

2012 Clifton Dassuncao

**Public Health Prevention Service (PHPS) Fellow Program**

2013 Martin Celaya

2012 Maridali DeLeon Torres

**Emory University MPH Mentorship Program**

2014 Siu Liu: Adam Fitch

2013 Kelly Nicole Wahl

2012 Ellen Jennifer Dugan

**LEADERSHIP (PLANNING AND ORGANIZATIONAL)**

Chairperson, Poster Session “Mixtures”, the 59th Annual Meeting of the Society of Toxicology, Baltimore Convention Center, Baltimore, MD, March 10 -14, 2019.

Chairperson, Workshop “Developmental Toxicity from Chemical Mixtures: Research to Application in Susceptible Populations”, the 54th Annual Meeting of the Society of Toxicology, San Diego Convention Center, San Diego, CA, March 22-26, 2015,

Chairperson, Workshop “Advancing Clinical and Translational Toxicology and Application of Biomarkers”, the 53rd Annual Meeting of the Society of Toxicology, Phoenix Convention Center, Phoenix, AZ, March 23-27, 2014.

Chairperson, “Chemical Mixtures” Session, the 52nd Annual Meeting of the Society of Toxicology, Henry Gonzalez Convention Center, San Antonio, TX March 10-14, 2013.

Chairperson, “Risk Assessment Approaches: Data-Derived Extrapolations, QSAR, In Silico Strategies, and Surrogates”, the 51st Annual Meeting of the Society of Toxicology, Mascone Convention Center, San Francisco, CA, March 11-15, 2012.

Workshop on Cumulative Risk Assessment: Resources Availability, Toxicology and Risk Assessment Conference, Cincinnati, OH April **2011**

Workshop on Weight of Evidence for Mutagenic Mode of Action and Combined Exposures, University of Ottawa, Ottawa, Canada March 23-24, **2011**

Workshop on Toxicology and Risk Assessment of Chemical Mixtures, Society of Toxicology Annual Meetings, Washington, DC March **2011**.

Workshop on Cumulative Risk Assessment of Concepts and Methods, Toxicology and Risk Assessment Conference, Cincinnati, OH April **2010**

Workshop on Mixtures Risk Assessment, Society Risk Analysis Annual Meetings, Salt Lake City, UT December 2010

Member of the Steering Committee, Conference “Assessing Bioavailability as a Determinant of Pollutant Exposure: Building a Multidisciplinary Paradigm for the 21st century and Beyond, February 19-21, 2008.

Workshop “Intermediate Topics in Health Risk Assessment of Chemical Mixtures” at the Toxicology and Risk Assessment Conference, April 14 – 17, 2008, West Chester, OH.

Chairperson SOT Presidents’: A Perspective on Mixtures Toxicology – Historical Highlights, the 46th Annual Meeting of the Society of Toxicology, Charlotte, NC, March 25- 29, 2007.

Chairperson of SOT’s Contemporary Concepts in Toxicology Conference, “Charting the Future: Building the Scientific Foundation for Mixtures Joint Toxicity and Risk Assessment” the Society of Toxicology’s, February 16-17, 2005, Atlanta, GA

Chairperson, “Risk Assessment I ”, the 44th Annual Meeting of the Society of Toxicology, New Orleans Conventional Center, New Orleans, LA, March 7-10, 2005.

Chairperson, “TCDD (Dioxin) and other POPS (Persistent Organic Pollutants)/ In Vivo”, the 43rd Annual Meeting of the Society of Toxicology, Baltimore Convention Center, Baltimore, MD, March 21-25, 2004.

Co-chair, Workshop on “The Scientific Principles and Risk Based Methodologies for Assessing Cumulative Health Risk Assessment from Exposure to Chemical Mixtures Course , Cincinnati, OH, April 14-18, 2002.

Member, Planning and Steering Committees, International Conference on Chemical Mixtures, Crowne Plaza Ravinia Hotel, Atlanta, GA, September 10-12, 2002.

Member, Planning Committee, Conference on Application of Technology to Chemical Mixture Research, Colorado State University, Fort Collins, CO, January 9-11, 2001.

Co-chairperson, Using Quantitative Structure-Activity Relationships (QSAR/SAR) for Toxicity Estimation of Hazardous Substances, Conference on Toxicology and Risk Assessment Approaches for 21st Century, Kings Island and Conference Center, Kings Island, OH, April 10 - 13, 2000.

Member, Executive Planning Committee, The Health Impact of Chemical Exposures during the Gulf War: A Research Planning Conference, Crown Plaza Hotel-Atlanta Airport, Atlanta, GA, February 28- March2, 1999.

Member, Planning Committee, Conference on Current Issues on Chemical Mixtures, The Lincoln Center for Performing Arts, Fort Collins, CO, August 11-13, 1997.

Chairperson, “Toxicity of Mixtures”, the 35th Annual Meeting of the Society of Toxicology, Anaheim Conventional Center, Anaheim, CA, March 10-14, 1996.

Co-chairperson, European Conference in Combination Toxicology, Veldhoven, The Netherlands, October, 1995.

Co-chairperson, Physiological-Based Pharmacokinetic Models, the 34th Annual Meeting of the Society of Toxicology, Baltimore Conventional Center, Baltimore, MD, March 5-9, 1995.

Co-chairperson, Emerging Issues Session, the Second Annual Health Effects Research Laboratory Symposium, the U.S. Environmental Protection Agency on "Chemical Mixtures and Quantitative Risk Assessment," Research Triangle Park, NC, November 7-10, 1994.

Chairperson, Session B: Requirements for Structure Activity Relationships and Toxicity Estimation Methods, the U.S. Department of Health and Human Services Workshop "Decision Support Methodologies for Human Health Risk Assessment of Toxic Substances," Atlanta, GA, October 18-20, 1993.

Co-chairperson, Symposium "Toxicology and Risk Assessment of Chemical Mixtures," Annual Meetings of the American Society of Pharmacology and Experimental Therapeutics, Experimental Biology '93, New Orleans, LA, March 28-April 1, 1993.

Chairperson, Symposium "Risk Assessment of Chemical Mixtures: Biologic and Toxicologic Issues, Annual Meeting of the Society of Toxicology, Seattle Convention Center, Seattle, WA. February 23-27, 1992.

Organizer and Lead-Scientist, U.S. Environmental Protection Agency "Workshop on Weight-of-Evidence of Chemical Interactions," Omni Netherland Plaza Hotel, Cincinnati, OH. August 27-28, 1991.

Organizer and Lead-Scientist, U.S. Environmental Protection Agency "Workshop on Quantitative Modeling of Structure Activity Relationships," Omni Netherland Plaza Hotel, Cincinnati, OH. August 29-30, 1991.

U.S. Delegate and Key-note speaker "Complex Exposures and Health Effects: A Research Strategy, at the 4th International Conference on the Combined Effects of Environmental Factors, Peabody Court Hotel, Baltimore, MD. September 30 - October 3, 1990.

**LEADERSHIP: CAPACITY BUILDING**

**National Science and Technology Council** (**NSTC**)**:** The NSTC provides the President and others within the Executive Office of the President (EOP) with advice on the scientific, engineering, and technological updates and advancements. Serve on the Strategic Planning Committee and assist in the development of National Emerging Contaminants Research Initiative (NECRI). Facilitate interagency coordination to improve the identification, analysis, monitoring, and treatment methods of contaminants of Emerging Concern (CEC). Annual reports of the activities are prepared and sent to Congress and federal governmental departments and agencies.

**Interagency Coordination Committee for Validation of Alternative Testing Methods** (**ICCVAM**)**:** Serve as Agency lead representative. This large group of U.S. federal scientists review various alternative testing methods, participate/attend quarterly meetings held in Washington, DC. Annual reports of the activities are prepared and sent to various government entities including CDC, USEPA, NTP/NIEHS, etc.

**Society of Toxicology (SOT)** Government Liaison Group: To build on the collaborative partnership between SOT and CDC/ATSDR/NCEH, and other federal agencies such as USEPA, NIOSH, NIEHS to advance the science of toxicology and help CDC achieve the goal of protecting and promoting human and environmental health by promoting the work that is conducted with the centers of CDC at national and international level.

**Read-Across (RA) workgroup:** New approaches and methods (NAMs) are increasingly being adopted in chemical hazard identification and risk assessment. Read-across is one such technique that will be increasingly used to fill data gaps. This workgroup in engaged in reviewing data on various chemical classes to build read-across capacity, raise awareness of the state of science, application and acceptance of this technique. The techniques is based on the hypothesis that toxicity of an untested chemical (target) can be estimated from the toxicity data of an adequately tested chemical (source).

**In Vitro to In Vivo Extrapolation (IVIVE) workgroup**:

This group identifies, gains, access to high quality in vitro and in vivo data for developing, evaluating and applying IVIVE analyses and understand how the *in vitro* and *in vivo* toxicological responses are correlated. is to determine best practices and develop methods to implement them. Projects under this workgroup use both data rich and data poor models to convert an *in vitro* dose concentrations necessary to perturb a molecular target to corresponding plasma or tissue level in vivo. This research aims to facilitate the use of *in vitro* toxicity testing data in risk assessment and regulatory decision making.

**Health and Environmental Sciences Institute (HESI) workgroup**: The group comprised of experts from academia, government and industry focuses on risk assessment review of PBPK models, starting with data rich chemicals that have in vivo data to provide more confidence in the model predictions. The data analyses so far have revealed the lack of a standardized guidance/template that addresses both the needs of the reviewers and the model developers. A decision tree or framework is being developed that will help determine data inputs and models most useful based on a given set of needs.

**Organisation for Economic Co-operation and Development (OECD) workgroup:** The work focusses on data analyses of “data poor” chemicals for which PBK models are built based on mechanistic understanding rather than *in vivo* data. The workgroup is developing a guidance document for physiologically based kinetic (PBK) models to harmonize efforts of the Joint Research Center of European Commission (EU), the U.S.EPA and the World Health Organization (WHO). This guidance on the characterization, validation and reporting of PBK models using only data derived from non-animal methods. This would include case studies on applying these PBK models for read-across, interpretation of biomonitoring data, evaluation of fish bioaccumulation, high-throughput risk screening, and IVIVE.

**External Advisory Committee Superfund Research Program (SRP)**: Appointed as member of the External Advisory Committee of the Oregon State University (OSU) SRP grant entitled “PAHs: New Technologies and Emerging Health Risks.”

**Health and Environmental Sciences Institute** **Mixtures (HESI) Committee**: This committee is part of International Life Sciences Institute, Washington DC. It consists of about 15 international invited scientists who have worked on mixtures toxicity. The committee is representative of government, academic and private sector. During the past 5 years it has reviewed chemical interactions data to understand joint toxicity assessment of chemical mixtures. The findings have been presented at national and international conferences including the SOT and EUROTOX annual meetings.

**WHO/IPCS** Framework Workgroup: Risk assessment of combined exposure to multiple chemicals has been discussed by this international group of invited scientists, participated in workshop February 2011, Paris, France.

**U. S. Geological Survey** Mixtures Workgroup: Prioritizing Chemical Mixtures in Water from Public-Supply Wells in the United States.

**FIFRA Science Advisory Panel**: U.S. EPA established the FIFRA Science Advisory Panel to seek advice, information and recommendations for the Agency Administrator on Atrazine. I served as a member of the panel that developed a balanced expert assessment on issues the Agency was facing.

Society of Toxicology Chemical/Biological Terrorism Resource Registry Task Force

U.S. EPA’s Board of Scientific Counselors Computational Toxicology Subcommittee

CDC Speaker Bureau

HESI Mixtures Risk Assessment Methodology Technical Committee.

Mixtures Specialty, Society of Toxicology

Society of Toxicology Mixtures Task Force

Mixed Exposures Work Group, National Occupational Research Agenda, NIOSH (Member).

Military and Veterans Health Coordinating Board, Research Working Group (Member)

Conference on Application of Technology to Chemical Mixture Research (Member)

The Health Impact of Chemical Exposures during the Gulf War: A Research Planning Conference (Member)

Research Working Group of the Persian Gulf War Coordinating Board (Member)

Health Assessment Work Group, Interagency Air Assessment Team on Kuwaiti Crude Oil Fires (Member)

CDC Cigarette Ingredients Toxicology Analysis Working Group (Member)

ATSDR Publications Clearance Revision Team - APJAT (Chairperson)

AMHPS – Association of Minority Health Professions Schools program

ATSDR/IDPH Team - Evaluation of Air Pollution in Southeast Chicago (Member)

ATSDR Mixtures Workgroup (Co-chair)

Science Policy Oversight Committee (Division of Toxicology)

Computational Toxicology Laboratory Workgroup (Member)

ATSDR Dose Reconstruction Committee (Member)

ATSDR Structure Activity Relationships Focus Group (Co-Chair)

EPA Guidelines Work Group for the Health Risk Assessment of Chemical Mixtures (Member)

EPA's OHEA Pharmacokinetics Focus Group (PKFG)

**HONORS AND**

**AWARDS:**

**Outstanding Publication Award, 2022.** NCEH/ATSDR Honor Award“IVIVE: Facilitating the use of in vitro toxicity data in risk assessment and decision making”

**Outstanding Publication Award, 2021.** NCEH/ATSDR Honor Award“Per- and polyfluoroalkyl mixtures toxicity assessment “Proof-of-Concept” illustration for the hazard index approach”

**Fellow Academy of Toxicological Sciences (FATS),** **2013.** The Academy of Toxicological Sciences is the leading international organization that certifies toxicologists by peer review of education, professional experience, leadership, demonstrated achievement and scientific expertise.

**SOT Arnold J. Lehman Award, 2013**. SOT recognizes one individual each year who has made a major contribution to risk assessment or regulation of chemical agents.

**Excellence in Quantitative Sciences Award, 2010.** NCEH/ATSDR Awards**.** Significant accomplishments in informatics, statistics, or other quantitative sciences that add substantially to the body of knowledge in the scientific and public health community or improve public health outcomes through changes in public health practice, program, or policy.

**Best presentation Award, 2010.** 14th International Conference on QSARs in Environmental and Health Sciences held in Montreal, Canada. May **2010.**

**NIOSH Leadership Certificate of Appreciation,** **2006.** In recognition of your leadership and contributions to the development and implementation of the Nation’s occupational safety and health research agenda during the last decade.

**Excellence in Evaluation, 2005**. ATSDR, Leadership in Science –

Society of Toxicology, Risk Assessment Specialty, Best Abstract Award (2000)

Society of Toxicology, Risk Assessment Specialty, Best Abstract Award (1998)

CDC and ATSDR Honor Award Research - Operational (1996)

ATSDR Employee of the year (1995)

U.S. EPA Special Achievement Award (1993)

Who's Who in Science and Engineering (1993)

EPA's Peer Team-Award Pharmacokinetics Focus Group (1991)

U.S. EPA Special Service Award (1990)

U.S. EPA Sustained Superior Performance Award (1989, 1990)

**COMMUNICATION WITH DIVERSE GROUPS:**

The Toxicology Forum, Reston, VA. Summer Annual Meetings, Co-Chair, “Lessons Learned from the Applications of NAMs in Regulatory Decision-Making”, July 2021.

The National Academies of Sciences, Engineering and Medicine (NASEM), National Research Council, Washington, D C. "Cross cutting issues in PFAS risk assessment- Mixtures" presented at the Workshop on Federal Government Human Health PFAS Research, October 26 -27, 2020.

## PFAS Community of Practice (CoP) meeting. Perfluoroalkyl Substances Minimal Risk Levels and State Derived Values. ATSDR, Atlanta, May 2020.

The National Academies of Science (NAS), National Research Council, Washington, D C. "Overview of risk assessment approaches to mixtures”, August 14, 2018.

Society of Environmental Toxicology and Chemistry SETAC Lecture entitled “The ADME of Toxicological Interactions and Mixtures Risk Assessment Annual Meetings, Denver, CO, September 6-8, 2017.

Environmental Health Seminar, School of Public Health, Emory University entitled “Computational Toxicology and the Use of Imperfect Data”, April 2, 2015.

Society of Toxicology, Lecture “Regulatory Drivers and Available Resources”, C.E. course entitled “Demystifying Mixtures from Study Design Solution to Risk Assessment Application, 54th Annual Meetings, March 2015.

Society of Toxicology, Lecture “The Use of Binary Weight of Evidence to Characterize Chemical Interactions for Risk Assessment”, C.E. course entitled “Specialized Techniques for Dose Response Assessment and Risk Assessment of Chemical Mixtures, 51st Annual Meetings, March 2012.

*Réseau de recherche en santé* *environnementale (RRSE)*, Montreal, (Québec). Annual Spring Meeting of the Environmental Health Research Network of Quebec, Concepts and approaches to study toxic chemical mixtures. May 14, 2012.

The McLaughlin Centre of the University of Ottawa for Health Canada, workshop on “Weight of Evidence for Mutagenic Modes of Action and Combined Exposures” Ottawa, Canada, Potential Implications for Contaminated Sites Methodology, March 23-24, 2011.

The National Academy of Sciences, Emerging Science for Environmental Decisions, Standing Committee, National Research Council, Washington, D C. Mixtures and Cumulative Risk Assessment: New Approaches Using the Latest Science and Thinking about Pathways July 27-28, 2011.

Society of Toxicology of Canada, Plenary Lecture, 41st Annual Symposium, Application of mixture risk assessment methods to hazardous wastes and contaminated sites, Nov 29-Dec 1, 2009.

The National Academy of Sciences, Board of Environmental Studies and Toxicology Sub-Committee, National Research Council, Washington, D C. Assessment of Combined Health Effects of Hydrogen Cyanide

and Carbon Monoxide: Joint Toxic Action of Chemical Mixtures, April 4 -5, 2007.

The National Academy of Sciences, Board of Environmental Studies and Toxicology Sub-Committee, National Research Council, Washington, DC. Refining the scope of potential NRC studies on cumulative risk from exposure to more than one chemical and influence of age, health status, diet, and genetic variability of the exposed populations, October 18-19, 2000.

Interagency workgroup, Mixed Exposures Research Group, National Institute of Occupational Safety and Health Conference Center, Morgantown, WV Chemical Mixtures in the Environmental Public Health Research Agenda, Sept 21, 2000.

Sixth International Symposium on Metal Ions in Biology and Medicine, San Juan, Puerto Rico, Joint Toxicity of Inorganic Chemical Mixtures: the Role of Dose Ratios, May 2000.

Conference on Topics in Toxicology and Risk Assessment, Wright-Patterson AFB, OH, Programmatic Approach to Evaluate Diverse Chemical Mixtures Encountered at Hazardous Waste Sites, April 1999.

Current Issues on Chemical Mixtures Conference, Co-sponsored by National Institute of Environmental Health Sciences and Colorado State University, Fort Collins, CO, Evaluation of Chemical Mixtures of Public Health Concern: Estimation vs Experimental Determination of Toxicity, August 1997.

Centers for Disease Control and Prevention (CDC), Atlanta, GA. Delegation of Health Officials, Government of Delhi, India including Dr. Ramesh Chandra (Principal Secretary, Medical and Public Health), Dr. T.K. Joshi, and Dr. Harsh Vardhan (Minister of Health, Law, Justice and Legislative Affairs), The regulation of toxic chemicals in the United States, November 8, 1995.

International Congress of Toxicology-VII, Seattle, WA, Risk Assessment of Chemical Mixtures from a Public Health Perspective, July 1995.

Fifth Symposium of the American Society of Testing Materials (ASTM) on Environmental Toxicology and Risk Assessment, Denver, CO, The Development and Application of Biomarkers in Public Health Practice and Risk Assessment , April 1995.

U. S. Department of Health and Human Services Workshop - Decision Support Methodologies for Human Health Risk Assessment of Toxic Substances, Atlanta, GA, Toxicity Estimation Using Statistical Methods, October 1993.

International Congress on the Health Effects of Hazardous Waste, Atlanta, GA, The Public Health Impact of Chemicals and Chemical Mixture By-Products at Hazardous Waste Sites, May 5, 1993.

University of Minnesota, Toxicology Program Seminar Series, Duluth, MN, Opportunities for Research in the field for Risk Assessment of Chemicals, February 4, 1993.

Association of Government Toxicologists and National Chapter of the Society of Toxicology sponsored symposium Toxicology of Mixtures of Chemical Substances, National Institute of Health, Bethesda, MD, Federal Agency Guidelines for Risk Assessment of Chemical Mixtures, October 1, 1992.

Maharashtra Pollution Control Board and Rashtriya Chemicals and Fertilizers Limited, Bombay, India, Environmental Chemicals their Toxicology and Regulation, June 18, 1992.

World Health Organization address to the delegates, Cincinnati, OH "Research, guidelines, document and data bases - the driving force of risk assessment," May 22, 1992.

American Industrial Hygienists Committee (AIHC), Cincinnati, OH, Chemical Mixtures Research, January 7, 1992.

Cincinnati Carcinogenesis and Mutagenesis Research Consortium (CCMRC), Cincinnati, OH, Risk Assessment and Complex Mixtures, November 21, 1991.

U.S.EPA/TRI Expert Panel to discuss Multiple Compounds/Multiple Routes of Exposures, Hyatt Regency Hotel, Bethesda, MD, Risk Characterization for Chemical Mixtures, August 1990.

**PUBLICATIONS:**

**CONTRIBUTION TO SCIENTIFIC KNOWLEDGE BASE (> 100 PUBLICATIONS IN HIGH IMPACT JOURNALS)**

ZARUS, G.M., MUIANGA, C., BRENNER, S., STALLINGS, K., CASILLAS, G., POHL, H.R., Mumtaz, M.M., and GEHLE, K. (2023). Worker Studies Suggest Unique Liver Carcinogenicity Potential of Polyvinyl Chloride Microplastics. Am J Ind Med. 2023;1–15. DOI: 10.1002/ajim.23540 wileyonlinelibrary.com/journal/ajim

CHANG, X., TAN, Y-M., et al. and MUMTAZ, M. M. (2022).IVIVE: Facilitating the Use of In Vitro Toxicity Data in Risk Assessment and Decision Making. Toxics**:** 10, 232. https://doi.org/10.3390/toxics10050232.

MUMTAZ, M. M., NICKLE, R., LAMBERT, J.C. and JOHNSON, M. S. (2022). Advances in Assessing Hazard and Risk to Emerging Threats and Emergency Response: Comparing and Contrasting Efforts of 3 Federal Agencies. Tox. Sci. 185(1), 2022, 1–9. <https://doi.org/10.1093/toxsci/kfab126>

ZEICKLE, C., MUMTAZ, M.M., et al., MYATT, G. (2022). Principles and Procedures for Assessment of Acute Toxicity Incorporating *in silico* Methods. Comp. Toxicol. 24:100237. <https://doi.org/10.1016/j.comtox.2022.100237>

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**BOOK CHAPTERS**

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