Whitney V. Christian, Ph.D.

whitney.christian@medtronic.com

Professional Strengths

Expertise in applied toxicology and risk assessment for purposes of product registration and safety assurance. Routinely analyze dose-response and exposure assessment data to maintain compliance with current regulations, communicate through written and verbal means to internal/external audiences, and function individually and in teams.

Experience & Education

Medtronic plc — Jacksonville, FL
Managing Principal Toxicologist — *October 2015-Present*

Cardno ChemRisk — Pittsburgh, PA
Health Scientist II — *January 2013-October 2015*

University of Rochester School of Medicine and Dentistry — Rochester, NY
Ph.D. Molecular Toxicology — *December 2010-December 2012*
M.S. Molecular Toxicology — *August 2007-December 2010*

University of Rochester School of Medicine and Dentistry — Rochester, NY
Managing Research Assistant — *April 2003-August 2007*

University of North Carolina at Chapel Hill — Chapel Hill, NC
Managing Research Assistant — *September 2001-April 2003*

Davidson College — Davidson, NC
B.S. Biology — *August 1997-May 2001*

Trinity Preparatory School of Florida — Winter Park, FL
Salutatorian — *August 1993-May 1997*

Key Projects & Skills

Experienced in quantitative risk assessment involving the use of exposure assessment methods, including physiologically based pharmacokinetic (PBPK) models. Technical lead for hazardous substances/materials-of-concern compliance, biocompatibility evaluations, and specific areas of toxicology, including toxicokinetics, metal toxicology, nanotoxicology (particle toxicology), immunotoxicology (hypersensitivity responses, sensitization), endocrine-disruption, neurotoxicology, genotoxicity, and carcinogenesis.

Medical Devices

- ❖ *Toxicology & Biocompatibility Subject Matter Expert at Medtronic plc*

- □ Conduct applied toxicology, risk assessment, and biocompatibility evaluations according to NRC/NAS, ISO 10993, ISO 18562, and FDA ODE CDRH Biocompatibility Guidance in support of new product development (R&D), product sustainability, regulatory affairs, and crisis management. Incorporate modern and cost-effective methods, such as quantitative structure activity relationship analysis (e.g., OECD Toolbox, ToxTree, etc.), read-across, and *in vitro* alternatives, into toxicological risk assessment and biocompatibility evaluations.

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- Lead hazardous substances compliance program for Medtronic Restorative Therapies Group. Oversee compliance to hazardous substances regulations, including EU MDR, EU REACH (SVHCs), EU POP, California Proposition 65, EU RoHS, China RoHS, WEEE, EU Packaging & Waste, and EU Battery Directive, as well as materials-of-concern restrictions, including animal/insect-derived materials, latex, nanomaterials, and geography-specific material requirements.
  - Design and implement procedures within new product development and change management processes to establish hazardous substances compliance.
  - Incorporate Product Governance & Compliance software into PLM system to track and maintain hazardous substance compliance data.
  - Develop business unit, business group, and corporate-wide blanket justifications for the presence of hazardous substances in devices when needed (i.e., EU MDR, California Proposition 65).

- Participate in CAPAs, examination of customer complaints, and issue impact assessments of medical devices. Lead root cause analysis investigations of biocompatibility testing failures and hazardous substances/materials-of-concern discoveries.

- Audit contract research organizations for compliance to ISO 17025, 21 CFR Parts 58 and 211, and ISO 10993 standards.

- Investigate and remediate the biocompatibility of products attained by business acquisition: Sophono Bone Conducting Hearing System, Visualase Cooled Laser Applicator System, VenaSeal Adhesive, etc.

- Addressed food allergy in medical devices. Conducted first-ever dose-response assessment of tropomyosin for use in safety analysis of chitosan-containing products (e.g., ChitoGels). Evaluation of type I hypersensitivity reactions and IgE cross-reactivity in the tropomyosin-sensitive patient population.

- Determined the risk of neurotoxicity from exposure to 2,4-dichlorobenzoic acid generated as a byproduct of curing silicone used in medical devices. Read-across examination of toxicity data from pesticides with homologous chemical structures.

  ❖ *Consultant to Johnson & Johnson DePuy*

- Participated in the programming and adaptation of a PBPK model to describe the behavior of ingested chromium. Developed a correlation between exposure and response metrics for the risk assessment of chromium toxicity in metal-on-metal hip implant patients and to understand dose-dependent physiological metabolism.

- Developed a non-epidemiological, quantitative risk assessment approach to determining the risk of systemic genotoxicity and carcinogenesis posed by metal-on-metal hip implants under normal and abnormal wear scenarios.

  ➢ *Invited lecturer for the Medical Device and Combination Product Specialty Section Webinar Series and the Continuing Education Courses of the Society of Toxicology.*

- Developed a mathematical model for estimating particulate body burdens from metal-on-metal hip implant wear debris based on particle size characteristics. Utilized the model to calculate appropriate doses for toxicity testing and to determine the physiological relevance of *in vitro* and *in vivo* doses used in the scientific literature.

- Designed, developed, and managed studies investigating *in vivo* induction and elicitation thresholds for deep tissue metal sensitization resulting from exposure to wear debris in patients with metal-on-metal hip implants.

  - *Collaboration with Dr. Ian Kimber, professor of Toxicology (a.o.e., skin sensitization, allergy, and immunotoxicology) at The University of Manchester, Manchester, UK.*

Food Safety

- Designed and implemented a human study investigating the health risks associated with the consumption of lead (Pb) and cadmium (Cd)-containing chocolate. Studied the correlation between blood metal levels resulting from chocolate consumption and PBPK model predictions in order to understand the toxicokinetics of low dose exposures. Assessed serum indices of liver and kidney toxicity as well as blood transcriptomics to investigate early indicators of Pb and Cd toxicity for use in NexGen risk assessment.

  - *Collaboration with the U.S. Army Center for Environmental Health Research for purposes of modeling and examining the effects of low dose exposures to heavy metals and developing biomarkers for risk assessment.*

- Conducted a state-of-the-science report on the toxicity of bisphenol A (BPA). Assessed the domestic and international regulatory policies surrounding BPA and evaluated the toxicology of possible alternatives to BPA in polycarbonate plastics. Expertise was used to support decision-making processes regarding the safety of using BPA-containing consumer and non-consumer products.

- Technical lead on obesogens, a subclass of endocrine-disrupting chemicals. Co-authored *"Does this Chemical Make Me Fat? The New Frontier of Endocrine Disruption"*, an article explaining endocrine-disruption and the role of obesogens in human disease for the 2014 DRI Toxic Torts & Environmental Law Seminar.

- Investigated claims that the enterohepatic circulation of antimony, which was ingested as a result of consuming a vitamin supplement contaminated with the metalloid, resulted in an antimony body burden that was responsible for permanent injury and regression of autism.

Product Sustainability

- Implemented a NexGen risk assessment approach to investigate the risk posed by ingestion of Pb in lipstick to the occurrence of elevated blood lead levels (BLLs) and adverse health effects in adults and children under various exposure scenarios. Used a Pb biokinetic model (IEUBK) to determine the amount of ingested lipstick required to raise BLLs above regulatory guidance values.

- Assisted with the development of exposure reconstruction scenarios for risk assessment of nanomaterials, and evaluated the utility of high-throughput analyses of endocrine-disruption for chemicals used in the tire industry. Summarized scientific literature on the genotoxicity and carcinogenicity of cobalt (Co) salts, and applied read-across for determining the genotoxicity and carcinogenicity of Co salts used in the tire industry that have not been investigated for these properties.

- Performed a toxicological evaluation of benzyl butyl phthalate to address business/product line acquisition concerns.

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Industrial Chemicals & Occupational Health and Safety

- Defined internal permissible exposure limits (IPELs) for 1,6-hexanediol diacrylate and diethylene glycol monoethyl ether based on toxicity data.

- Evaluated and advised on internal occupational exposure limits (OELs) for naphthalene based on recent regulatory action taken by OSHA in the State of California to lower the permissible exposure limit.

- Performed a health risk evaluation to address worker complaints upon reoccupation of a building fumigated with chlorine dioxide gas (ClO_2). Assessed exposure through air monitoring, surface wipe, and lift samples. Derived dermal irritation values to determine likelihood of irritation from surface contact with residual breakdown products of ClO_2.

- Conducted benzene exposure reconstruction and assessment for claims alleging the development of myeloproliferative disorders (e.g., leukemia, myelofibrosis) from occupational benzene exposure.

- Conducted asbestos exposure reconstruction in occupational and non-occupational settings. Evaluated the dose, frequency, and duration of exposure to calculate product-associated cumulative fiber burdens for analysis of causation in cases of mesothelioma.

- Evaluated a manufacturing facility's health and safety program, compliance with regulatory policies, and the significance of workers' claims regarding the development of pulmonary disease(s) as a result of exposure to microbial-contaminated metal working fluid at the work site.

- Conducted mechanistic research to delineate likely immunomodulatory modes-of-action for classes of polychlorinated biphenyl (PCB) congeners (i.e., immunosurveillance distress), and developed approaches to address the latency and aggression of PCB-related cancers in claims alleging the development of various lymphomas from occupational PCB exposure.

- Technical lead on exposures involving 1-bromopropane in the furniture manufacturing industry.

Regulatory Policy

- Participate in MedTech Europe Working Groups and contribute to writing regulatory guidance for the medical device industry on EU MDR hazardous substances justification criteria, endocrine disrupting chemicals, and warning labeling.

  - *Co-founder of MedTech Europe Cobalt Collaboration Workstream.*

- Constructed a weekly newsletter on chemical regulation used for company-wide notification of evolving regulatory policies on numerous chemicals, including BPA and phthalates.

- Contributor to Cardno ChemRisk blog regarding regulatory policies on BPA and phthalates: http://www.cardnochemrisk.com/index.php?option=com_easyblog&view=latest&Itemid=2.

- Contribute articles on regulatory changes to the Medical Device and Combination Product Specialty Section newsletters.

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Publications & Abstracts

Coleman, K.P., W.V. Christian, W. Zhang. 2019. "Biocompatibility and Performance of Medical Devices—Chapter 10 - Accelerating Medical Device Biocompatibility Evaluation: An Industry Perspective." [In Progress].

Christian, W.V. and J. Brown. 2017. "Food Allergy in Medical Devices: Risk Assessment of Tropomyosin in Chitosan-Containing Products." Abstract. Toxicol. 150:274.

Christian, W.V. and P.M. Hinkle. 2017. "Global Functions of Extracellular, Transmembrane and Cytoplasmic Domains of Organic Solute Transporter β Subunit." Biochem J. 474(12):1981-1992.

Brice, S.E. and W.V. Christian. 2017. "The Use of Genetic Evidence to Defend Against Toxic Tort Claims—Part I." Intell. Prop. & Tech. L.J. 29(9):3-10.

Brice, S.E. and W.V. Christian. 2017. "The Use of Genetic Evidence to Defend Against Toxic Tort Claims—Part II." Intell. Prop. & Tech. L.J. 29(10):9-14.

Brice, S.E. and W.V. Christian. 2017. "The Use of Genetic Evidence to Defend Against Toxic Tort Claims—Part III." Intell. Prop. & Tech. L.J. 29(11):3-11.

Winans, B., B.E. Tvermoes, K.M. Unice, M. Kovochich, E.S. Fung, W.V. Christian, E. Donovan, B.L. Finley, I. Kimber, D.J. Paustenbach. 2016. Data on the Histological and Immune Cell Response in the Popliteal Lymph Node in Mice Following Exposure to Metal Particles and Ions. Data Brief. 9:388-397.

Tvermoes, B.E., K.M. Unice, B. Winans, M. Kovochich, W.V. Christian, E. Donovan, E.S. Fung, B.L. Finley, I. Kimber, D.J. Paustenbach. 2016. "A Preliminary Evaluation of Immune Stimulation Following Exposure to Metal Particles and Ions Using the Mouse Popliteal Lymph Node Assay." Toxicol Appl Pharmacol. 308:77-90.

- *Awarded 2017 Best Published Paper Regarding Medical Devices for this manuscript. Medical Device and Combination Product Specialty Section - Society of Toxicology Conference, Baltimore, MD, March, 2017.*

Tvermoes, B., K. Unice, B. Winans, M. Kovochich, W. Christian, E. Donovan, B. Finley, I. Kimber, D. Paustenbach. 2016. "Evaluation of Immune Stimulation Following Exposure to Metal Particles and Ions Using the Mouse Popliteal Lymph Node Assay." Abstract. Toxicol Late-Abst Supp. Ab3896, 172.

Abramson, M.M., A.D. Monnot, W.V. Christian. 2016. "An Exposure and Health Risk Assessment of Lead (Pb) in Chocolate." Abstract. Toxicol. 150:302.

Monnot, A.D., W.V. Christian, M.M. Abramson, M.H. Follansbee. 2015. "An Exposure and Health Risk Assessment of Lead (Pb) in Lipstick." Food Chem Toxicol. 80:253-260.

Christian, W.V., L.D. Oliver, M. Kreider, D.J. Paustenbach, B.L. Finley. 2015. "Toxicology-Based Cancer Causation Analysis of CoCr-Containing Hip Implants: A Quantitative Assessment of Genotoxicity and Tumorigenicity Studies." Abstract. Toxicol. 144:430.

Monnot, A.D., W.V. Christian, M. Abramson, M.H. Follansbee. 2015. "An Exposure and Health Risk Assessment of Lead (Pb) in Lipstick." Abstract. Toxicol. 144:69.

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Christian, W.V., L.D. Oliver, D.J. Paustenbach, M.L. Kreider, B.L. Finley. 2014. "Toxicology-Based Cancer Causation Analysis of CoCr-Containing Hip Implants: A Quantitative Assessment of Genotoxicity and Tumorigenicity Studies." J Appl Tox. 34(9):939-967.

- *Awarded 2015 Best Published Paper Regarding Medical Devices for this manuscript. Medical Device and Combination Product Specialty Section - Society of Toxicology Conference, San Diego, CA, March, 2015.*

Monnot, A.D., W.V. Christian, D.J. Paustenbach, B.L. Finley. 2014. "Correlation of Blood Cr(III) and Adverse Health Effects: Application of PBPK Modeling to Determine Non-Toxic Blood Concentrations." Crit Rev Toxicol. 44(7):618-637.

Lippi, M., M. Abramson, W.V. Christian, A. Monnot. 2014. "Exposure Assessment of Children Ingesting Pb in Lipstick and Its Comparison to Regulatory Values." Abstract. Toxicol. 138:597.

Christian, W.V., L.D. Oliver, M. Kreider, B.L. Finley. 2014. "*In Vitro* Genotoxicity Assays with Co and Cr(III) Ions and Alloy Particles: Implications for Cancer Risks to Hip Implant Patients." Abstract. Toxicol. 138:248.

Ballatori, N., W.V. Christian, S.G. Wheeler, C.L. Hammond. 2013. "The Heteromeric Organic Solute Transporter, OSTα-OSTβ/SLC51: A Transporter for Steroid-Derived Molecules." Mol Aspects Med. 34(2-3):683-692.

Christian, W.V., N. Li, P.M. Hinkle, N. Ballatori. 2012. "The Beta Subunit of the Ostα-Ostβ Organic Solute Transporter Is Required Not Only for Heterodimerization and Trafficking but Also for Function." J Biol Chem. 287(25):21233-21243.

Christian, W.V., P.M. Hinkle, N. Ballatori. 2012. "Residues Required for Functional Interaction of the Two Subunits of the Organic Solute Transporter, Ostα-Ostβ." Abstract. Toxicol. 965:206.

Christian, W.V., N. Li, N. Ballatori. 2011. "The Transmembrane Domain Region of the Beta Subunit of the Organic Solute Transporter Alpha-Beta is Essential for Heterodimerization with the Alpha Subunit." Abstract. FASEB Journal. 554.1:25.

Fang, F., W.V. Christian, S.G. Gorman, M. Cui, J. Huang, K. Tieu, N. Ballatori. 2010. "Neurosteroid Transport by the Organic Solute Transporter OSTα-OSTβ." J Neurochem. 115(1):220-233.

Cui, M., X. Tang, W.V. Christian, Y. Yoon, K. Tieu. 2010. "Perturbations in Mitochondrial Dynamics Induced by Human Mutant PINK1 Can Be Rescued by the Mitochondrial Division Inhibitor mdivi-1." J Biol Chem. 285(15):11740-11752.

Cui, M., R. Aras, W.V. Christian, P.M. Rappold, M. Hatwar, J. Panza, V. Jackson-Lewis, J.A. Javitch, N. Ballatori, S. Przedborski, K. Tieu. 2009. "The Organic Cation Transporter-3 Is a Pivotal Modulator of Neurodegeneration in the Nigrostriatal Dopaminergic Pathway." Proc Natl Acad Sci U S A. 106(19):8043-8048.

Ballatori, N., N. Li, F. Fang, J.L. Boyer, W.V. Christian, C.L. Hammond. 2009. "OST Alpha-OST Beta: A Key Membrane Transporter of Bile Acids and Conjugated Steroids." Front Biosci. 14:2829-2844. Review.

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Ballatori, N., F. Fang, W.V. Christian, N. Li, C.L. Hammond. 2008. "Ostalpha-Ostbeta Is Required for Bile Acid and Conjugated Steroid Disposition in the Intestine, Kidney, and Liver." Am J Physiol Gastrointest Liver Physiol. 295(1):G179-G186.

Ballatori, N., W.V. Christian, J.Y. Lee, P.A. Dawson, C.J. Soroka, J.L. Boyer, M.S. Madejczyk, N. Li. 2005. "OSTalpha-OSTbeta: A Major Basolateral Bile Acid and Steroid Transporter in Human Intestinal, Renal, and Biliary Epithelia." Hepatology. 42(6):1270-1279.

Dawson, P.A., M. Hubbert, J. Haywood, A.L. Craddock, N. Zerangue, W.V. Christian, N. Ballatori. 2005. "The Heteromeric Organic Solute Transporter Alpha-Beta, Ostalpha-Ostbeta, Is an Ileal Basolateral Bile Acid Transporter." J Biol Chem. 280(8):6960-6968.

Myster, S.H., F. Wang, R. Cavallo, W. Christian, S. Bhotika, C.T. Anderson, M. Peifer. 2004. "Genetic and Bioinformatic Analysis of 41C and the 2R Heterochromatin of Drosophila Melanogaster: A Window on the Heterochromatin-Euchromatin Junction." Genetics. 166(2):807-822.

Lom, B., W.V. Christian, S. Hooper, R. Zsoldos. 2002. "Kidney Organogenesis in Xenopus Embryos: *In Vivo* Observations and Modulation by Retinoic Acid." Abstract. Dev Biol. 247:440-441.

Peer Reviewer

Journal	Area of Review
❖ *Critical Reviews in Toxicology*	*Bisphenol A*
❖ *Journal of Exposure Analysis and Environmental Epidemiology*	*Phthalates*

Seminars & Invited Talks

"Extractables and Leachables Analysis of Medical Devices in a Changing Global Regulatory Environment." Society of Toxicology Conference, Workshop: Known Unknowns: Challenges and Approaches for Handling Chemical, Hazard, and Regulatory Uncertainty in Medical Device Safety Assessments. Anaheim, CA, March 2020.

"European Union Medical Device Regulation (2017/745): Nanomaterials and Animal-Derived Material." European Union Medical Device Regulation (EU MDR) Office Hours Webinar Series. Medtronic, Inc., Minneapolis, MN. November 15th, 2018.

"Medical Device Immunotoxicology: Modern Approaches and Special Cases." Current Progress in Immunotoxicology from Medical Devices through Biologics, Mid-Atlantic Society of Toxicology Spring Webinar. May 17th, 2016. http://www.toxicology.org/groups/rc/MidAtlantic/Spring2016Webinar.asp.

"Risk Assessment of Orthopedic Implants – Case Study of Metal-on-Metal Hip Prosthesis." Society of Toxicology Conference, Continuing Education Course: Advances in Safety Assessment of Medical Devices. San Diego, CA, March 22nd, 2015.

"Quantitative Risk Assessment of the Genotoxicity and Tumorigenicity of CoCr-Containing Hip Implants." Society of Toxicology, Medical Device and Combination Product Specialty Section Fall Webinar. September 24th, 2014. https://aim-hq.webex.com/aim-hq/lsr.php?RCID=d053fab884b5413297a94600e2f16376.

"Does This Chemical Make Me Fat? The New Frontier of Endocrine Disruption." Defense Research Institute, Toxic Torts and Environmental Law Seminar. February 20th, 2014.

"Identification of Amino Acids Critical for the Function of the Organic Solute Transporter Alpha-Beta." University of Rochester, Rochester, NY: Toxicology Program Public Seminar. June 27th, 2011.

"Environmental Toxicants as Obesogens." University of Rochester, Rochester, NY: Department of Environmental Medicine Seminar Series. January 31st, 2011; Cardno ChemRisk, Pittsburgh, PA: Brown Bag Seminar Series. March 18th, 2013.

"When Mitochondrial Autophagy (Mitophagy) Doesn't Work." University of Rochester, Rochester, NY: Department of Environmental Medicine Seminar Series. March 22nd, 2010.

"A Novel Strategy for Lowering Cholesterol and Triglycerides: Disruption of the Enterohepatic Circulation of Bile Acids by Inhibiting the Organic Solute Transporter Alpha-Beta, Ostα-Ostβ." University of Rochester, Rochester, NY: Toxicology Program Retreat. May 28th, 2009.

"The Organic Solute Transporter OSTα-OSTβ: A Potential Therapeutic Target for Dyslipidemia." University of Rochester, Rochester, NY: Department of Environmental Medicine Seminar Series. May 6th, 2009.

"The Fetal Basis of Adult-Onset Disease: Vinclozolin and Epigenetic Reprogramming of the Male Germ Line." University of Rochester, Rochester, NY: Gene-Environment Interactions Seminar Series. March 5th, 2009.

"Manganese-Induced Neurotoxicity: The Role of Astroglial-Derived Nitric Oxide in Striatal Interneuron Degeneration." University of Rochester, Rochester, NY: Neurotoxicology Seminar Series. March 5th, 2008.

Poster Presentations

"Food Allergy in Medical Devices: Risk Assessment of Tropomyosin in Chitosan-Containing Products." Society of Toxicology Conference. Baltimore, MD, March 14th, 2017; 2017 Science & Technology Conference. Minneapolis, MN, October 17th, 2017.

- *Awarded 2017 Best Poster Presentation. Medical Device and Combination Product Specialty Section - Society of Toxicology Conference, Baltimore, MD, March, 2017.*

"Evaluation of Immune Stimulation Following Exposure to Metal Particles and Ions Using the Mouse Popliteal Lymph Node Assay." Society of Toxicology Conference. New Orleans, LA, March 17th, 2016.

"An Exposure and Health Risk Assessment of Lead (Pb) in Chocolate." Society of Toxicology Conference. New Orleans, LA, March 15th, 2016.

"Toxicology-Based Cancer Causation Analysis of CoCr-Containing Hip Implants: A Quantitative Assessment of Genotoxicity and Tumorigenicity Studies." Society of Toxicology Conference. San Diego, CA, March 25th, 2015.

"An Exposure and Health Risk Assessment of Lead (Pb) in Lipstick." Society of Toxicology Conference. San Diego, CA, March 23rd, 2015.

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"Exposure Assessment of Children Ingesting Pb in Lipstick and Its Comparison to Regulatory Values." Society of Toxicology Conference, Phoenix, AZ. March 27th, 2014.

"*In Vitro* Genotoxicity Assays with Co and Cr(III) Ions and Alloy Particles: Implications for Cancer Risks to Hip Implant Patients." Society of Toxicology Conference, Phoenix, AZ. March 25th, 2014.

"Residues Required for Functional Interaction of the Two Subunits of the Organic Solute Transporter, Ostα-Ostβ." Society of Toxicology Conference, San Francisco, CA. March 13th, 2012; University of Rochester, Graduate Student Society Poster Session, Rochester, NY. April 20th, 2012; National Institute of Health, Bile Acid-Mediated Integration of Metabolism and Liver Disease Conference, Bethesda, MD. June 8th, 2012.

"The Transmembrane Domain Region of the Beta Subunit of the Organic Solute Transporter Alpha-Beta Is Essential for Heterodimerization with the Alpha Subunit." Experimental Biology Conference, Washington DC. April 11th, 2011; University of Rochester, Toxicology Program Retreat, Rochester, NY. June 3rd, 2011.

"Characterization of the Beta Subunit of the Organic Solute Transporter Alpha-Beta: Determining Residues Important for Functionality, Heterodimerization, and Cellular Trafficking of the Heteromeric Bile Acid Transporter." University of Rochester, Toxicology Program Retreat, Rochester, NY. May 23rd, 2010.

"Ostα-Ostβ is Required for Bile Acid and Conjugated Steroid Disposition in the Intestine, Kidney, and Liver." University of Rochester, Toxicology Program Retreat, Rochester, NY. May 25th, 2008.

Teaching

University of Rochester

Teaching Assistant-TOX 521 Biochemical Toxicology — *Spring Semester 2011*

Societies, Service, & Awards

Association for the Advancement of Medical Instrumentation

- Member of Mutagenicity, Carcinogenicity, and Reproductive Toxicity Working Group 6 — *2015-present*

Society of Toxicology — *2011-present*

- Specialty Sections
  - *Medical Device and Combination Product* — *2013-present*
    - ❖ *Executive Committee, Vice-President Elect* — *2018-present*
    - ❖ *Executive Committee, Councilor* — *2016-2018*
    - ❖ *Best Published Paper Regarding Medical Devices* — *2015, 2017*
    - ❖ *Best Poster Presentation* — *2017*
  - *Regulatory and Safety Evaluation* — *2015-present*
  - *Risk Assessment* — *2013-present*
  - *Food Safety* — *2013-2015*
  - *Metals* — *2013-present*

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Regional Chapters

Southeast — *2015-present*

- *Executive Committee, Secretary/Treasurer* — *2019-present*
- *Executive Committee, Councilor* — *2017-2019*

Allegheny-Erie — *2013-2015*

University of Rochester

Cardno ChemRisk Applied Toxicology and Risk Assessment Ambassador — *2014-2015*

Robert N. Infurna Award for Best Scientific Publication by a Graduate Student — *2012*

Outstanding Scientific Methodology Award — *2012*

Bristol-Myers Squibb Travel Award — *2009*

Toxicology Program Training Grant — *2007-2012*

Graduate Student Society — *2007-2012*

Davidson College

Beta Beta Beta National Biological Honor Society — *1999-2001*