

## RESEARCHER

### Research Interests:

- \* Ecology
- \* Ecotoxicology
- \* Aquatic Toxicology
- \* Environmental analytical chemistry of organic compounds
- \* Environmental Chemistry (Fates of trace substances in aquatic ecosystems)
- \* Trace metal analysis and speciation, cycling and toxicity
- \* Simulation models of environmental fates of trace substances
- \* Microcosms and multi-species toxicity testing
- \* Biochemical & molecular toxicology (Biomarkers)
- \* Wildlife toxicology
- \* Polycyclic aromatic hydrocarbons
- \* Photo-induced toxicity in aquatic organisms
- \* Avian toxicology and habitat requirements
- \* Planar, halogenated hydrocarbons (PCBs, PCDD and PCDF)
- \* Ecological risk assessment
- \* Agricultural Chemicals
- \* Endocrine modulating compounds
- \* Perfluorinated compounds: analytical and environmental chemistry and toxicity
- \* Sediment toxicity assessment

### Research Projects:

*(All values are in US dollars at the time of the award and not corrected for inflation)*

U.S. EPA, "Fate of cadmium introduced into artificial stream systems". 1975-1976, \$250,000

U.S. EPA, "Cycling of trace contaminants from coal combustion in aquatic ecosystems". 1976-1977, \$ 240,000

U.S. EPA, "Kinetics of Cadmium and Zinc Accumulation and Elimination by Freshwater Crayfish". 1977-1978, \$ 104,000

NSF-RANN, "Microcosms in Environmental Research". 1978-1979, \$6,000

U.S. EPA, "Microcosms in Environmental Research". 1978-1979, \$5,000

National Environmental Research Park (DOE), "Microcosms in Environmental Research". 1978-1979, \$4,500

Electric Power Research Institute, "Microcosms in Environmental Research". 1978-1979, \$4,500

Institute of Ecology, University of Georgia, "Microcosms in Environmental Research". \$1,500

Environmental Protection Agency, "Fates and Biological Effects of Polycyclic Aromatic Hydrocarbons in Aquatic Systems". 1978-1981, \$1,130,000

Michigan Agricultural Experiment Station "Evaluation of Phosphoadenylate Concentrations and the Adenylate Energy Charge as a General Integrative Measure of Stress in Fish". 1981-1982, \$65,000

NOAA Sea Grant Program, "Lysosomal Enzyme Release Assay (LERA) as a Measure of Stress in Fish". 1982-1985, \$111,000

U.S. Department of Interior Office of Water Resources Technology, "Metal Speciation in Surface Waters of the Great Lakes Region". 1982, \$24,000

Michigan State University Vice President for Research Atomic Absorption Spectrometry Equipment Grant. 1982, \$52,000

Michigan State Agriculture Experiment Station Toxicology Research Program "Light Induced Toxicity of Polycyclic Aromatic Hydrocarbons". 1982-1985, \$72,950

Michigan State Agricultural Experiment Station Toxicology Research Program "Relationship between Residue Concentrations in Chinook Salmon Eggs and Rearing Temperature on Rearing Mortality". 1982, \$16,119

NOAA-Office of Marine Pollution Assessment "Changes in the Free Amino Acid Pool of Benthic Invertebrates as a Sublethal Toxic Response to Pentachlorophenol." 1983-1984, \$50,464

NIH Biomedical Research Funds "Use of Scanning Electron Microscopy Energy Dispersive X-Ray Analysis and Image Processing as a Rapid Monitor of Lead Concentrations in Freshwater Molluscs". 1983, \$3,560

CIBA-Geigy Corporation, Agricultural Division. "Professional development award for environmental toxicology". 1984, \$25,000

U.S. Fish and Wildlife Service, Great Lakes Fisheries Laboratory. "Effects of Environmental Stress on the Early Life Stages of Lake Trout". 1984, \$12,657

Mideast Peace Fellowship Program for Egypt. "Potential for Decreased Fish Production in the Nile River System due to the Insecticide Dursban". 1984-1985, \$30,900

NOAA Sea Grant Program. "Phototoxicity of Polycyclic Aromatic Hydrocarbons to Lake Michigan Plankton". 1985-1986, \$54,000

U.S. Department of Interior Cooperative State Water Sources Research Program MSU Center for Environmental Toxicology. "Chronic Toxicity of TCDD and TCDF to Rainbow Trout: Effects on Viability of Eggs and Survivorship of Fry". 1985, \$24,500

U.S. EPA, "Toxicity of In-Place Pollutants on Benthic Invertebrates". 1985-1987, \$258,000

Michigan Agricultural Experiment Station "Effects of 2,3,7,8 Dibenzo-p-dioxin on Reproduction of Rainbow Trout". 1985-1986, \$47,000

U.S. EPA, "Equipment-Mass Spectrometer". 1986, \$98,000

Egyptian Cultural and Educational Bureau "Effects of Insecticides on Nile River Fishes". 1985-1986, \$5,000

U.S. Department of Agriculture "Effects of Vitamin A on Responses of Rainbow Trout to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)". 1986-1987, \$28,000

Michigan Sea Grant College Program "Effects of Maternal Exposure of Rainbow Trout to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) on Reproduction". 1987-1988, \$149,800

Michigan State University Center for Environmental Toxicology "Synthesis of 3H-labelled 2,3,7,8-TCDD". 1986, \$4,000

Michigan Toxic Substance Control Commission "Determination of 2,3,7,8-TCDD Equivalents in Environmental Samples". 1987-1988, \$54,000

U.S. Fish and Wildlife Service; "Use of rat hepatoma H-4-II-E cells as a screen for complex mixtures of polychlorinated hydrocarbons in environmental samples". 1987-1989, \$64,000

U.S. Army Corps of Engineers "Toxicity of Sediments and Water in Toledo, Ohio and Buffalo, New York Harbors". 1987, \$54,000

Michigan State University Center for Environmental Toxicology "Effects of Planar, Chlorinated Hydrocarbons on Salmonid Reproduction of Great Lakes Fishes". 1987, \$6,000

Michigan Sea Grant College Program "PCB Residues in Lake Michigan Chinook Salmon Collected From the Ludington Area: Variation Due to Size and Season". 1988, \$4,995

Ludington Michigan Area Charter Boat Association "PCB Residues in Lake Michigan Chinook Salmon Collected from the Ludington Area: Variations due to Size and Season". 1988, \$10,000

Michigan State University-All University Competitive Research Funds."Development of flow cytometry methodologies for use in short-term algal toxicity tests". 1988, \$3,500

Pesticide Research Enhancement Program, MSU. "PCB concentrations in Great Lakes fishes- Human hazards". 1988-1989, \$58,000

U.S. EPA "Toxicity of sediments in Green Bay, WI". 1988-1989, \$40,875

"Verband der Chemische Industrie Deutschland". Development of Quantitative Structure Activity Models to Evaluate the Toxicity of Chemicals in Commerce". 1987-1988, \$11,627

U.S. Dept. Ag. Coop. State Res. Serv. Food and Agriculture National Needs Graduate Fellowship Water Sciences "Water Quality Improvement by Agricultural Systems Management". 1989-1992, \$144,000

Michigan Agricultural Experiment Station "Concentrations of Complex Mixtures of Polychlorinated Hydrocarbons in Great Lakes Fish and Their Potential Effects on Humans". 1988-1990, \$57,000

Michigan Agricultural Experiment Station "Equipment Grant". 1988, \$4,000

U.S. Fish and Wildlife Service "Sediment Toxicity of Selected Refuges". 1988-1990 \$18,000

U.S. EPA "Sediment Toxicity Assessment Protocol Development: Field Validation in the Grand Calumet River". 1988-1990, \$223,351

U.S. EPA "Organic Contaminants in Sediments of the Grand Calumet River, Indiana". 1988-1989, \$48,000,

U.S. EPA "Effects of Mixtures of Toxic Chemicals to Colonial, Fish-eating Water Birds of Green Bay Wisconsin". 1989, \$40,000

U.S. Army Corps of Engineers "Effects of Holding Times on Toxicity of Sediments to Invertebrates". 1989, \$36,145

U.S. EPA Exploratory Research Program. "Toxicity of Complex Mixtures of Polychlorinated Hydrocarbons to Great Lakes Salmonid Fishes". 1989-1990, \$250,450

Pesticide Research Center Research Enhancement Program. "Complex Mixtures of Polychlorinated Aromatic Hydrocarbons: In Vitro Bioassay in Fish, Bird and Human Cells in Culture. 1989-1990, \$40,000

U.S. EPA "Assessment and Remediation of Contaminated Sediments". Under Section 118 of the Clean Water Act. 1989, \$14,991

Michigan Audubon Society and McGregor Fund. "Biochemical Determination of Mixtures of Co-planar, Polychlorinated Hydrocarbon in Great Lakes, Fish-eating Colonial Waterbirds". 1989-1990, \$89,135

U.S. Fish and Wildlife Service. "Use of the H-4-II-E rat Hepatoma Cell/Environmental Extract Bioassay for Determination of 2,3,7,8-Tetrachlorodibenzo-p-dioxin equivalents in Environmental Samples". 1989-1990, \$22,500

U.S. EPA. "Toxicity of Sediments of the Trenton Channel, Michigan". 1989, \$10,875

U.S. Forest Service. "Trace Contaminants in and Their Effects on American Bald Eagles in Voyagers National Park". 1989-1990, \$32,000

U.S. Department of Agriculture. "Chlorinated dibenzo-dioxins and dibenzo furans in fillets of chinook salmon". 1989-1990, \$14,000

U.S. EPA Superfund (Roy F. Weston). "Toxicity of Clear Creek Sediments". 1989, \$28,130

U.S. EPA Superfund Roy F. Weston "Sediment Toxicity of the Saint Mary's River, Michigan". 1989, \$28,130

Consumers Power Company. "Effects of Hydroelectric Projects on Eagle Populations in Michigan". 1990, \$414,000

U.S. EPA Superfund. "Bioavailability of Lead to Swine fed Soil Contaminated with Lead Sulfide". 1990, \$127,089

Michigan State University-Biotechnology Research Excellence Fund. "Development of Novel Cell Lines for Screening of Environmental Toxicants: *In vitro* Bioassay for Complex Mixtures of Polyhalogenated Aromatic Compounds". 1990, \$29,960

Miller Brewing Company. "Contaminants in Eagle Blood". 1990, \$3,000

Consumers Power Company. "Contaminants in Eagle Blood". 1990, \$29,000

USDA-Forest Service. "Satellite Telemetry of Adult Bald Eagles". 1990, \$35,000

US Army, Aberdeen Proving Grounds. "Satellite Telemetry of Adult Bald Eagles". 1990, \$75,000

Earthwatch Foundation. "Bald Eagle Population of Michigan". 1990, \$57,600

Michigan Dept. Military Affairs. "Bald Eagle Population of Michigan". 1990, \$18,000

Michigan Dept. Natural Resources Nongame Wildlife Program. "Contaminants in Eagle Blood". 1990, \$1,850

Minnesota Pollution Control Agency. "Contaminants in Eagle Blood". 1990, \$2,000

U.S. Fish and Wildlife Service. "Development of an Automated Carbon Chromatography System for the pre-analysis Separation of Non-ortho-substituted PCB Congeners". 1990, \$48,000

U.S. Fish and Wildlife Service. "Relationships Between Toxic Chemicals in Double-Crested Cormorant Eggs and Birth Defects". 1990-1991, \$54,000

U.S. EPA-ERL Duluth. "Method for Sediment Toxicity Assessment". 1990-1991, \$70,000

U.S. EPA Great Lakes National Program Office. "A Study of the Lower Saginaw River and Adjoining Saginaw Bay: a PCBs and Trace Metals". 1990-1991, \$125,207

Michigan Great Lakes Protection Fund. "Methods for the Rapid, Sensitive, Inexpensive Screening of Environmental Samples for Planar, Halogenated Hydrocarbons". 1990-1991, \$115,128

Inland Steel Co. "Assessment of the Toxicity of Sediments in Indiana Harbor". 1990, \$45,000

General Electric Co. "Effects of Microbial Reductive Dechlorination of PCBs on Their Toxicity". 1991, \$202,275

U.S. EPA. "Systemic Availability of Lead to Young Swine from the Chronic Administration of Lead-Contaminated Substrates". 1991, \$91,431

Michigan Department of Natural Resources. "Toxicity of Great Lakes Fish to River Otter (*Lutra canadensis*)". 1991, \$72,885

Earthwatch Foundation. "Bald Eagle Population of Michigan". 1991, \$72,000

U.S. EPA, "Transfer of Selected Halogenated Organic Compounds from the Sediments of the Lower Saginaw River and Saginaw Bay to Fish and Fish Eating Water Birds". 1991-1992, \$160,000

Great Lakes Protection Fund. "Assessment of Genetic Diversity of and Contaminants in Bald Eagles of the Great Lakes Region". 1992, \$200,000

Low USDA. "Development of Novel Recombinant Human Cell Lines for Detection of Levels of Toxic Polyhalogenated Aromatic Compounds". 1991-1992, \$20,000

U.S. Department of Agriculture. Food and Agricultural Sciences National Needs Graduate Fellowships Program. "Water Science Fellowship Training Program". 1990-1993, \$192,000

U.S. Fish and Wildlife Service. "Effects of PCBs and Related Compounds in the Chicken as an Avian Model". 1991-92, 47,000

U.S. National Institutes of Environmental Health Safety. "Development of a Novel Cell Line for the Assessment of the Effects of Planar Chlorinated Hydrocarbons". 1991-1994, \$822,802

U.S. Forest Service Challenge Grant. "Bald Eagle Population Biology and Contaminants in Chippewa, Superior and Hiawatha National Forests". 1991, \$34,000

University of Wisconsin. "Concentrations of Contaminants in Birds". 1991-1992, \$60,000

U.S. Department of Agriculture "Contaminants in Bald Eagles and Eagle Population and Habitat Analysis". 1991, \$39,000

Michigan Food & Crop Bioprocessing Center Research Excellence Fund "Development and Utilization of Recombinant Cell Bioassay Systems for the Detection of Toxic Halogenated Aromatic Hydrocarbons". 1991-92, \$25,000

U.S. EPA ERL-Duluth. "Assessment of Effects of Planar Hydrocarbons in Birds of Saginaw Bay, Michigan". 1991-1992, \$70,000

U.S. EPA ERL-Duluth. "Sediment Quality Criteria". 1992, \$10,000

Consumers Power Co. "Assessment of Michigan Bald Eagle Populations". 1992, \$329,106

U.S. EPA. "A Pilot Study for Contaminant Uptake in Two Species of Albatross in the North Pacific Ocean". 1992, \$84,530

World Wildlife Fund. "Contaminants in Animals of the North Pacific". 1992, \$24,000

U.S. FWS. "Contaminants in Great Lakes Birds". 1992, \$37,000

U.S. DI. "Assessment of Productivity and Contaminant Exposure on Nesting Bald Eagles in Michigan". 1992, \$15,000

Michigan Great Lakes Protection Fund. "Analysis Methods and Biochemical Mechanisms of Chlorinated Aromatic Compounds in Biota of the Great Lakes". 1992-1993, \$144,904

Great Lakes Protection Fund. "Assessment of Genetic Diversity of Bald Eagles in Michigan". 1993, \$143,000

MSU Pesticide Research Center, Research Enhancement funds. "Fractionation and Evaluation Techniques for Ah-r-active compounds in the Environment". 1992-1993, \$17,700

U.S. Fish & Wildlife Service. "Use of the H4IIE Rat Hepatoma Cell/Environmental Extract Bioassay for determination of 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents in Environmental samples." 1992-1993, \$37,950

SERE Group. "Contaminants in Fish and Birds of the Great Lakes Region". 1993. \$20,774

US-EPA. "Methods of Fractionation and Identification of Planar Halogenated Hydrocarbons in Birds from Saginaw Bay, Michigan. 1992-1993, \$50,000

U.S. EPA. "Contaminant Uptake in Two Species of Albatross in the North Pacific Ocean". 1992-1994, \$753,483

USDA. "Development and Application of a Novel Bioassay System for Detection of Estrogen-like Compounds in Foods and Feedstuffs". 1993, \$20,000

US EPA. "Co-planar compounds in the tissues of birds from Saginaw Bay, Michigan". 1993-1994, \$70,000

Upjohn Co., Kalamazoo, MI. "Use of birds and Semi-Permeable Passive Samplers for monitoring". 1993, \$125,000

Upjohn Co., Kalamazoo, Mi. "Equipment Grant" Gas Chromatograph. 1993, \$36,000

Michigan State University Vice President for Research. "Co-planar compounds in the tissues of birds from Saginaw Bay, Michigan". 1993-1994, \$9,000

U.S. Fish and Wildlife Service. "Contaminants in Eagle Blood". 1993-1994, \$9,000

U.S. Fish & Wildlife Service. "Birth Defects in Eagle from the Great Lakes Region". 1993-1994, \$27,000

Michigan Department of Natural Resources. "Evaluation of Toxicity of Sediments in the Lower Detroit River". 1993-1994, \$50,000

MSU Pesticide Research Center Research Enhancement Award. "Analysis Methods and Biochemical Mechanisms of Action of Chlorinated Aromatic Compounds in Biota of the Great Lakes". 1993-1994, \$15,000

National Food Toxicology Center "Estrogenic Compounds in Fish of The Great Lakes". 1993-1994, \$20,000

National Food Toxicology Center. "An assessment of the Toxicity of Chemical Oxidation Products of Aqueous Contaminants by Monitoring Intercellular Communication in Mammalian Cell Cultures". 1993-1994, \$20,000

NIEHS. "Development of Novel Bioassay/Biomarker Systems for Detection of Estrogen Agonists in Complex Mixtures." 1994-1999, \$894,652

US EPA-Office of Water. "Bioavailability and Effects of Organic and Inorganic Compounds in Water & Sediment Systems". 1994-1999, \$660,000

Chemical Manufacturers Association. Estrogen Agonists in the Environment, Effects on Fish & Wildlife." 1994-1999, \$1,500,000

US-EPA Great Lakes National Program Office. "Determination of sources and Trends of PCBs in the Detroit River, Michigan." 1994-1996, \$96,000

MSU Cancer Institute. "Methods for determining the strength of estrogen agonists in the environment". 1994, \$25,000

Michigan Dept. Natural Resources. "Determination of sources and Trends of PCBs in the Detroit River, Michigan." 1994-1996, \$84,000

Upjohn Co. Kalamazoo, Michigan. "Semi-Permeable Sampling Devices for Monitoring the Aquatic Environment". 1994-1995, \$67,000

Michigan Great Lakes Protection Fund. "Defining Persistent, Bioaccumulative and Toxic Great Lakes and Research Needs". 1995-1997, \$139,050

C.J. Johnson, Co. "In vivo Methods of Screening for Endocrine Compounds in Aquatic Systems". 1996-1997, \$10,000

Dow Corning Corp. "Determination for Potential Effects of Polydimethylsiloxanes (PDMS) on Sediment Function". 1995-1997, \$65,000

Fogerty Institute, NIEHS "Training and Research in Environmental Health: The Balkans".  
1996-2001, \$776,308

US EPA Competitive Grants Program, Biology Exploratory Research Panel  
"Development of a Bioassay for AhR-mediated Toxicity to Rainbow Trout". 1997-1999, \$304,771

DowElanco, Inc. "Ecological Risk Assessment for the Organochlorine Insecticide *Chlorpyrifos*". 1996-1997, \$1,000,000

Dow Chemical Company, Inc. "Endocrine Modulators in the Environment". 1997-1999, \$60,000

Southern Nevada Water District. "Monitoring of Estrogenic Substances in Surface and Drinking Water". 1997, \$11,000

Chemical Manufacturers Association. "Estrogen Agonists in the Environment, Effects on Fish & Wildlife." 1998, \$50,000

Southern Nevada Water District. "Monitoring of Estrogenic Substances in Surface and Drinking Water". 1998-1999, \$250,000

Chemical Manufacturers Association, Ethoxylates panel. "Concentrations of Alkylphenol ethoxylates and their Degradation Products in Fish". 1998-1999, \$216,000

Woodward-Clyde. "Determination of Total Dioxin-Like Activity in Kestrel Eggs at the Rocky Mountain Arsenal". 1998, \$179,465

Indo-US Joint Research Program. "A Semi-Automated, Multicomponent Analysis Method for Planar Aromatic Chlorinated Hydrocarbons (PCHs) and Other Compounds in Marine Organisms". 1998-2000, \$225,000

Ciba Specialty Chemicals, "Estrogenicity of Selected Chemicals". 1998, \$13,000

Michigan Department of Environmental Quality. "Agricultural and Industrial Residues in Tissues of Amphibians in Lower Michigan". 1998-1999, \$47,000

Ciba Specialty Chemicals. "Estrogenicity of Process Chemicals". 1998, \$6,000

Raytheon, Inc. “Distribution of PCBs in Sediments of The Sudbury River, Massachusetts 1998, \$47,000

Fox River Consortium. “Ecological Risk Assessment of PCBs in the Fox River, Wisconsin”. 1998-1999, \$301,834

Michigan Department of Environmental Quality. “A Strategic Environmental Quality Monitoring Program for Michigan’s Surface Waters: Sediments”. 1999-2010, \$1,056,800

3M Company. “Perfluorinated Chemicals in the Environment”. 1999-2000, \$1,300,000

Michigan Department of Environmental Quality. Surface Water Quality Division. “Temporal Monitoring of Chemical Residues in Michigan Inland Lake Sediments”. 1999-2003, \$581,332

Raytheon, Inc. “Distribution of PCBs in Sediments of The Sudbury River, Massachusetts 1999, \$40,000

Great Lakes Protection Fund. “Trophic Level Accumulation of Residues in the Great Lakes”. 1999, \$15,000

Kalamazoo River Study Group. “Ecological Risk Assessment of PCB in Sediments of the Kalamazoo River, Michigan”. 2000-2003, \$2,119,544.

Hong Kong Environmental Protection Department. “Development of a Biological Indicator System for Monitoring Marine Pollution (RCP/1488). 2001-2003. \$1,064,102.

Alkylphenol Ethoxylates Research Council “Concentrations of APEOS and their Degradation Products in Water, Sediments and Fish of Michigan Rivers”. 2000, \$25,000

Hercules, Inc. “Assessment of Toxicity of perfluorinated Compounds”. 2000, \$75,000

Michigan Great Lakes Protection Fund. “Baseline Characterization of Saginaw Bay Watershed Sediments”. 2001, \$77,000

Ecorisk, Inc. “Mechanisms of Action of Atrazine in Adult and Metamorphosing *Xenopus Laevis* and *Rana Clamitans*”. 2001-2003, \$769,714

Michigan Department of Environmental Quality. “Dioxins in the Titabawassee River System”. 2002, \$75,000

US EPA. US EPA. US EPA. “Use of the H295R Human Adrenocortical Carcinoma Line for Screening for Effects of Compounds on Steroidogenesis”. 2002-2004, \$399,998

Dow Chemical Company, Midland, MI. “Ecological Impacts of PCDD/Fs on the Tittabawassee River”. 2003, \$326,000

Ciba Specialty Chemicals, Manchester, UK. “Assessment of the Estrogenic Potential of Fluorinated Compounds”. 2003, \$15,000

Hong Kong Ministry of Environment. “Application of Biomarkers to Assess Effects of Pollutants in Hong Kong Harbor”. 2002-2003, \$104,778

National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan. “Survey of Concentrations of Perfluorinated Chemicals in the Marine Coastal Waters of China and Korea”. 2003, \$32,000

Brown and Caldwell, Maui, Hawaii. “Analysis of Industrial Chemicals in Waste Waters from Honolulu”. 2003, \$19,020

US EPA. “Optimization of an Assay using the H295R Cell Line to Identify Chemical Modulators of Steroidogenesis and Aromatase Activity”. 2004-2006, \$894,050

Dow Chemical Co. “Field Studies in Support of the Tittabawassee River Ecological Risk Assessment.” 2004-2008, \$8,071,939

Hong Kong University Grants Council. “Studies on Endocrine Disruptors and Red Tide Toxins in Coastal Waters of Hong Kong: A Risk Assessment Approach”. 2004-2005, \$166,666

Hong Kong University Grants Council. “Establishment of the Center for Marine Environmental Research and Innovative Technology (MERIT)”. 2004-2009, \$12,911,392

US EPA Science to Achieve Results (STAR) Program on Computational Toxicology and Biology in Hazard Identification and Risk Assessment. “Chemical Induced Changes in Gene Expression Patterns (GEPs) using a Small Fish Model: A Systems Approach”. 2004-2007, \$750,000

Hong Kong University Research Grants Council. “Fates and Effects of PFCs and PBDEs in the environment.” 2005-2006. \$130,485.

Hercules Inc. “Assessment of Toxicity Potential of Perfluorinated Compounds”. 2005-2006. \$50,000

Canada Research Chairs Program. “Establishment of the Canada Research aChair in Environmental Toxicology at the University of Saskatchewan”. 2006-2011, \$1,400,000.

Dow Chemical Company. “Mink Feeding Study: Kinetic Evaluation Exposure to Ecologically Relevant Concentrations of 2,3,7,8-TCDF and 2,3,4,7,8-TCDF”. 2006. \$349,224.

US EPA. “Standardization and Refinement of the H285R Cell-Based Assay to Identify Chemical Modulators of Steroidogenesis and Aromatase Activity”. 2006-2007, \$507,327.

Dow Chemical Company. “Exposure of the Ecological Food Web in the Saginaw River to Polychlorinated dibenzofurans. 2006-2007, \$705,414.

Canadian Foundation for Innovation (CFI). “Equipment grant to purchase LC/MS-MS mass spectrometer. 2006, \$815,608.

Western Economic Diversification Canada. “Bioanalytical Toxicology Tools for Industry.” Equipment/infrastructure grant (match funding for Canada Foundation for Innovation grant). 2007, \$465,000.

Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning. “Avian Developmental Toxicity of Perfluorochemicals-Species Sensitivity Differences and Mechanisms of Action.” 2007-2009, \$378,670.

Canada Foundation for Innovation Major infrastructure grant, New Initiatives Fund, Ottawa, ON, Canada. “Aquatic Toxicology Research Facility “. 2006. \$6,313,000.

Dow Chemical Co. “Examination of the Relative Potency (ReP) of two Dibenzofuran congeners (2,3,7,8-TCDF and 2,3,4,7,8-TCDF) in a Model Mammalian System”. 2006-2008, \$841,958.

3M Company. “Temporal and Spatial trends of Perfluorinated Chemicals in the Environment”. 2007-2011, \$1,000,000.

Dow Chemical Co. “Use of AhR Amino Acid Sequences to Predict the Relative Sensitivity of Birds to Polychlorinated Dibenzofuran (PCDF) and Polychlorinated Dibenzodioxin (PCDD) Congeners”. 2007-2009, \$280,000

Dow Chemical Co. “In ovo Toxicity of Polychlorinated Dibenzofuran (PCDF) and Polychlorinated Dibenzodioxin (PCDD) Congeners to Birds”. 2007-2009, \$270,000

3M Corp. “Determination of Relative Response Factors and Matrix Effects on Quantification of Perfluorinated Compounds”, 2007, \$29,750.

Teckcominko, Inc. “Toxicological Assessment of White Sturgeon (*Acipenser transmontana*) Early Life Stages Exposed to Liquid Effluents of the Teckcominco Metals Ltd. Trail Facility” 2007, \$337,590.

Michigan Department of Environmental Quality for “A Strategic Environmental Quality Monitoring Program for Michigan’s Surface Waters: The Inland Lakes Sediment.” 2007-2008, \$473,594.

US EPA. “Standardization and Refinement of the H285R Cell-Based Assay to Identify Chemical Modulators of Steroidogenesis and Aromatase Activity”. 2007, \$176,394.

US EPA. “Global Inter-laboratory Validation of the H285R Cell-Based Assay to Identify Chemical Modulators of Steroidogenesis and Aromatase Activity”. 2007-2008, \$612,183.

National Science and Engineering Research Council of Canada (NSERC). “Risks of Polyfluorinated Compounds in the Environment” Discovery Grants Program, 2007-2012, \$200,000.

Western Economic Diversification Foundation (Canada). “Establishment of a Novel Toxicology Research, Development and Chemical Testing Industry in Saskatoon, Saskatchewan, Canada. 2009-2011. \$1,770,000.

Hong Kong University Research Grants Council. "Functional relationship between HIF and 3-beta-HSD2 in zebrafish: A gain and loss-of-function study" 2007-2010, \$121,795.

Hong Kong University Grants Council. “Measurement and assessment of perfluorinated compounds in waterbirds and marine cetaceans in Hong Kong”. 2007-2009, \$ 87,941.

Saskatchewan Health Research Foundation. “Intrauterine Antecedents of Inflammatory Mediated Disease” 2007-2009, \$300,000.

Teckcominko, Inc. “Toxicological Assessment of White Sturgeon (*Acipenser transmontana*) in the Upper Columbia River - Water Related Issues” 2008, \$1,227,645.

Mid Saskatchewan Regional Economic and Co-operative Development. “Investigation of Nutrient Sources and Causes of Algal Blooms in Lake Diefenbaker, Saskatchewan.” 2008-2009, \$100,000.

Chinese National Basic Research Project (973 Program). “Ecological Risk Assessment and Control Strategy of Regional Mixed Pollution”. 2007-2011, (3,100,000 RMB) \$387,500.

Chinese National Science Support Project. “Integrated Technologies and Mechanism Design for POPs Control and Treatment”. 2007-2010, (4,500,000 RMB) \$562,500.

Alberta Water Research Institute. “Safe, Secure Water Supplies in Alberta”. 2008-2010, \$3,300,000.

Dow Chemical Co. “Dynamics of Polychlorinated Dibenzo Furans in Tissues of Japanese Quail, Chickens and Turkeys”. 2008-2009, \$658,000.

Chinese Ministry of Education and the State Administration of Foreign Experts. “Marine biogeochemistry and ecotoxicology” (“111” Program). 2007-2012, (4,500,000 RMB) \$789,000.

Hong Kong Research Grants Council, Group Research Program. “Environmental Screening, Computational and Biological Characterization of Endocrine Disruptors in Respect to Receptor Binding, Embryo and Gonad Physiology. 2009-2012, (45,000,000 HKD) \$ 641,026.

Hong Kong Research Grants Council, Group Research Program Centre for Marine “Environmental Research and Innovative Technology (MERIT)”. 2009-2012 (\$66,600,000 HKD) \$8,538,461.

Teckcominko, Inc. “Assessment of Surface Water Toxicity to White Sturgeon (*Acipenser transmontanus*) in the Upper Columbia River. 2009-2010. \$966,299.

Hong Kong General Research Fund (GRF). “Understanding the relationship between gender, estrogen and telomere biology in fish: Towards developing an alternative vertebrate model for aging studies” No: 9041468, 2009-2012 (HK\$730,000). \$93,590.

Chinese Ministry of Education. "Study on marine environmental physiology and toxicology" , 2010-2014, (3,000,000 RMB) \$439,303.

National Science and Engineering Research Council of Canada (NSERC). “CREATE Training Program in Human and Ecological Risk Assessment (HERA)”. 2010-2015, \$1,634,292.

U.S. EPA Great Lakes Restoration Initiative, Toxic Substances and Areas of Concern, Program: I-A-6 Great Lakes Sediment Core Surveillance Program. 2010-2015, \$2,000,000.

Teck American Inc. “Pilot Study to Develop Methods for Studying the Potential Effects of Metals in Sediments on White Sturgeon (*Acipenser transmontana*) Larvae” 2010, \$101,046.

Teck American Inc. “Sediment Toxicity Testing on Early Life-Stages of White Sturgeon (*Acipenser transmontanus*)”. 2010-2011. \$554,162.

National Science and Engineering Research Council of Canada (NSERC), and Canada Institute for Health Research, Canada Health Research Program, Institute of Infection and Immunity (III). “Impact of Common Environmental Chemicals on the Allergy and Asma Epidemic”. 2009-2012 \$ \$616,591.

**TOTAL RESEARCH GRANTS (US Dollars)**

**\$90,823,857**