

**PERSONAL:**

Name: ***J. Marshall Clark***  
 Position: Professor of Environmental Toxicology & Chemistry  
 Director, MA Pesticide Analysis Laboratory  
 Department of Veterinary & Animal Science  
 N311 Morrill Science Center 1  
 University of Massachusetts  
 Amherst, MA 01003-0230  
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**EDUCATION:**

Sabbatical Leave, University of Florida, Center for Epidemiology, Gainesville, FL 9/1/14-12/31/14

Sabbatical Leave, Scholar-in-Residence, Department of Biology, Salve Regina University, Newport, RI. 9/1/05-12/31/05

Sabbatical Leave, Invertebrate Genetics and Physiology Laboratory (Dr. J. Van Houten) Department of Biology, University of Vermont, Burlington, VT. 9/1/97-12/31/97

Personnel Training Certificate, EPA Good Laboratory Practice Standards, Garndal Associates, New Orleans, LA. 1993

Sabbatical Leave, Insect Genetic Laboratory (Drs. R. Denell and R. Beeman), Division of Biology, Kansas State University, Manhattan, KS. 1991

Molecular Biology and Biotechnology Summer Course, New England Biolabs, Inc., Smith College, Northampton, MA. 1990

Recombinant DNA Workshop, International Biotechnologies, Inc. and Kodak Co., UC-San Diego, San Diego, CA. 1990

Postdoctoral Fellow, Marine Biology Laboratory, Woods Hole, MA (Michigan State University). 1981

Ph.D. (Entomology, specialty in Insecticide and Environmental Toxicology), Michigan State University, "Pyrethroid Inhibition of Neural ATPases." 1981

M.S. (Entomology, specialty in Insecticide Toxicology) University of Wisconsin-Madison, "Metabolism of Toxaphene 1977

by Aquatic Sediments and a Camphor-degrading Pseudomonad."

B.S. (Zoology), Minor in Chemistry, University of Wisconsin-Madison. 1972

**POSITIONS HELD:**

Affiliated Faculty, Inst. for Applied Life Sci., Models to Medicine, Univ. of Massachusetts-Amherst 2016-present

Faculty Mentor, RI-INBRE/NIH Neuroscience Program 2009-2015

Professor, Department of Veterinary & Animal Science, University of Massachusetts-Amherst 2003-present

Adjunct Faculty, Graduate Program in Environmental Toxicology & Risk Assessment, School of Public Health, University of Massachusetts-Amherst. 2001-2006

Steering Committee, Plant Biology Graduate Program, University of Massachusetts-Amherst 2000-2002

Affiliated Faculty, Plant Biology Program University of Massachusetts-Amherst 2000-2008

UMASS Extension, Agroecology Program, University of Massachusetts-Amherst 1999-present

Adjunct Professor, Department of Biology, University of Vermont, Burlington. 1997-2000

Affiliated Faculty, Molecular and Cellular Biology Program, University of Massachusetts-Amherst. 1997-present

Professor, Department of Entomology, University of Massachusetts-Amherst. 1994-2003

Steering Committee, ENVSCI Program, University of Massachusetts-Amherst 1992-present

Coordinator, Env. Toxicol. & Chem., ENVSCI Program, CFNR, University of Massachusetts-Amherst. 1992-present

Affiliated Faculty, ENVSCI Program, CFNR, University of Massachusetts-Amherst. 1989-2012

Associate Professor, Department of Entomology, University of Massachusetts-Amherst. 1987-1994

Laboratory Director, Massachusetts Pesticide Analysis Laboratory, CFNR, University of Massachusetts-Amherst. 1984-present

Assistant Professor, Department of Entomology, University of Massachusetts-Amherst.	1981-1987
Summer Investigator, Marine Biological Laboratory, Woods Hole, MA.	1983, 1987, 1989

**OTHER PROFESSIONAL EXPERIENCE:**

Vice-Chairman and Session Moderator, International Conference on Green Plant Protection Innovation, Hainan, China	2018
Liaison Committee Member, ACS-AGRO/ESA-PBT	2018
Research Consultant, ParaPro LLC, Carmel, IN	2018
Scientific Committee, Organizing Committee, XXV International Congress of Entomology, Orlando, FL.	2016
Chair, Nominating Committee, AGRO Division, Amer. Chem. Soc.	2016
Selection Committee Member, J. Agr. Food Chem., Research Article of the Year Award Lectureship	2015-16
Research Consultant, Promius Pharma, Princeton, NJ	2016-present
Research Consultant, Optimization of a ivermectin-containing pediculicide, Sanofi-Pasteur Corp. France	2013-2015
Research Consultant, Larada Scientific, Inc., Development of AirAlle device for the control of head lice.	2014-present
Research Consultant, Council for the Advancements of Pyrethroid Risk Assessment (LG, Bayer, Syngenta, FMC, DuPont, Dow AgroScience)	2015-present
Research Consultant, Ovicidal action of DeOva formulation. Hatchtech Pyt Ltd., Melbourne, Australia	2014-present
Expert Witness, Council for the Advancement of Pyrethroid Risk Assessment (CAPHRA), FIFRA Scientific Advisory Panel, USEPA, Washington DC	2015
Program Committee, XXV International Congress of Entomology, Orlando, FL	2016
Program Committee, 5 <sup>th</sup> International Conf. on Phthiraptera, Park City, UT	2014
Scientific Program Committee, 13 <sup>th</sup> IUPAC International Congress of Pesticide Chemistry, San Francisco, CA	2013-14

ACS/AGRO Strategic Planning Workshop, Ft. Worth, TX	2011
Vice-Chair, Program Chair, Chair, AGRO Division, American Chemical Society, Washington, DC	2010-13
Editor-in-Chief, <u>Pesticide Biochemistry &amp; Physiology</u> , Elsevier, Meppel, The Netherlands	2010-
Program Committee, 4 <sup>th</sup> International Conf. on Phthiraptera, Cappadocia, Turkey	2010
Study Section Member, NIH/NIAID/DMID, Bioinformatics Resource Centers for Infectious Disease (ZAI1-LR-M-C1/C2), Washington DC	2009
Expert Witness, Common Mechanism Grouping for the Pyrethrins and Synthetic Pyrethroids, FIFRA Scientific Advisory Panel, USEPA, Washington DC	2009
NHGRI/NIH Human Body Louse Genome Working Group	2008-
ACS/AGRO Strategic Planning Workshop, Washington DC	2008
SETAC/AGRO Joint National Program Planning Committee, Pensacola, FL	2008
Scientific Committee, 12 <sup>th</sup> IUPAC Pesticide Science Congress, Melbourne, 2010	2008-10
Program Committee, 4 <sup>th</sup> Pan-Pacific Conference on Pesticide Science, ACS/AGRO & PSSJ, Honolulu, HI	2007-2008
Member, ACS/AGRO Program Committee	2006-2011
Consultant, Taro Pharmaceuticals Corp. Hawthorne, NY	2006-2011
Consultant, ParaPRO, Indianapolis, IN.	2006-
Consultant, Topaz Pharmaceuticals LLC, Jenkintown, PA.	2006-2012
Subject Editor, <u>J. Medical Entomology</u> , ESA, Washington, DC.	2005-2010
Editorial Board, <u>Environmental Science and Health</u> , Marcel Dekker, Inc. New York, N.Y.	2004-2007
Advisor, Control of Urban and Peri-urban Culex Mosquitoes (U01 AI058267-01, G. Lanzaro, PI), NIH/NIAID- Partnerships: Hepatitis B and Vector Borne Diseases Control.	2004-2007
Editorial Board, <u>Pest Management Science</u> , Wiley & Sons Publ. U.K.	2004-2010
Member, Scientific Program Committee, 11 <sup>th</sup> IUPAC International Congress of	

Pesticide Chemistry, Kobe, Japan	2004-06
Study Panel Member, Hepatitis B and Vector Borne Diseases Control, NIH/NIAID	2003
Chair, ACS/AGRO Special Program Committee	2001-2011
Consultant, FMC, Princeton, NJ.	2001-05
Program Chair, 3 <sup>rd</sup> Pan-Pacific Conference on Pesticide Science, 2003, Honolulu, HI	2001-03
Organizer, Subtopic 3c: Mode of Action and Resistance, Poster Sessions, 10th IUPAC International Congress on Chemistry of Crop Protection, August 4-9, 2002, Basal, Switzerland.	2000-02
Consultant, Merck & Co., Inc., Rahway, NJ.	2000-05
Scientific Advisory Panel, Cambria Biosciences, Bedford, MA.	1999-2004
Pyrethroids Working Group: FQPA Position Panel, PWG, Wilmington, DE.	1999-2006
Consultant, Medicis Pharmaceutical Corp., Scottsdale, AZ.	1999-2004
Editorial Board, <u>InSight Science Magazine</u> , Academic Press, San Diego, CA.	1999-2001
Toxicology Study Panel Member, EPA (STAR), 6/15-18/98, Washington D.C.	1998
Editorial Board, <u>Arch. Insect Biochem. Physiol.</u> , ESA, Washington, D.C.	1998-2003
Vice Chairman, U.S. Scientific Program, 2 <sup>nd</sup> Pan-Pacific Pesticide Conference, Honolulu, Hawaii.	1996-99
Member, External Review Comm., Dept. Entomology, University of Maryland, College Park, MD.	1996
Executive Committee, Agrochemicals Div., American Chemical Society, Washington, D.C.	1994-2011
Toxicology Study Section Member, NIH/Tropical Medicine and Parasitology.	1994-97
Toxicology Panel Member, USDA/NRICGP, Assessing Pest Control Strategies (51.6).	1994
ACS/Agrochem. Div. Young Scientist Recognition Award Comm.	1994-2010
Technical Member, USDA Regional Research Project NE-181.	1992-97
Technical Member, USDA Regional Research Project NE-180.	1992-98

Scientific Advisory Board, National Pediculosis Society, Boston, MA.	1991-2000
Ad Hoc Reviewer, USDA/National Research Initiative Competitive Grants Program (NRICGP).	1990
Editorial Board, <u>Pesticide, Biochemistry and Physiology</u> , Academic Press, New York, NY.	1991-
Toxicology Panel Member, USDA Competitive Grant (CRGO) Review Panel (Entomology/Nematology).	1989
Member, USDA Regional Coordinating Committee WRCC 60.	1987-94
Editorial Board, <u>Environmental Pollution</u> (Series A and B.) Elsevier Applied Science Publ. Ltd. Essex, U.K.	1986-95
Technical Member, USDA Regional Research Project NE115.	1982-92
Teaching Assistant, Department of Entomology, Insect Physiology, Dr. James Miller, Michigan State University.	1980
Graduate Research Assistant, Pesticide Research Center, Prof. Fumio Matsumura, Michigan State University.	1978-81
Teaching Assistant, Pesticide Research Center, Analysis of Pesticide Chemicals I and II - Dr. Matthew Zabik, Michigan State University.	1979-80
Teaching Assistant, Department of Entomology, Toxicology of Insecticides, Dr. Fumio Matsumura, University of Wisconsin-Madison.	1976
Graduate Research Assistant, Department of Entomology, Prof. Fumio Matsumura, University of Wisconsin-Madison.	1974-77
Research Assistant, Scientific Medical Institute, Dr. Stuart Updike, M.D., University of Wisconsin-Madison.	1974
Teaching Assistant, Department of Chemistry, Chemistry 223 - Analytical Chemistry, Dr. John Walters, University of Wisconsin-Madison.	1973
Research Assistant, McArdle Laboratory for Cancer Research, Dr. Van R. Potter, University of Wisconsin-Madison.	1970-71

## **PROFESSIONAL HONORS, AWARDS AND CITATIONS:**

Fellow, Entomological Society of America	2018
2008 Editors' Choice Award, Best Journal of Medical Entomology Paper, Entomology Society of America	2009
Fellow, Agrochemicals Division, American Chemical Society	2007
Outstanding Research Faculty, CNRE, UMASS-Amherst	2005
International Award for Research in Agrochemicals, American Chemical Society, Agrochemicals Division and DuPont Crop Protection.	2004
Distinguished University Teaching Award, Finalist, UMASS-Amherst.	1998-99
Rohm & Haas Recognition Award in Insect Physiology, Biochemistry and Toxicology, Entomological Society of America.	1998
Paul Dahm Memorial Lecturer, Iowa State University.	1995
Lilly Teaching Fellow, University of Massachusetts.	1990
Robert R. Driesback Memorial Award for Dissertation Research, Michigan State University.	1980
Doctoral Research Award, Entomological Society of America	1980
Graduate School Scholarship, Michigan State University.	1978, 1979
Graduated with Distinction (Zoology B.S.) University of Wisconsin-Madison.	1972

## **PROFESSIONAL SOCIETIES:**

The Entomological Society of America  
The Society of Environmental Toxicology and Chemistry - Charter Member  
The Society of Toxicology  
The Society for Neurosciences  
The American Chemical Society-Agrochemical, Environmental Chemistry and Toxicological Chemistry Divisions  
Japan Society for Bioscience, Biotechnology and Agrochemistry

## **TEACHING:**

VASCI 555, Chemicals and the Environment  
VASCI 585, Animal & Environmental Toxicology  
ENV SCI 315, Principles of Environmental Toxicology & Chemistry

ENV SCI H02, Honors Program in Environmental Toxicology & Chemistry  
ENV SCI 535, Methods in Environmental Toxicology & Chemistry  
ENV SCI 555, Environmental Toxicology in Context  
ENV SCI 191 & 194, Introductory Environmental Science Lecture Series

### **OTHER ACADEMIC ACTIVITIES:**

- A. *Undergraduate* – Dr. Clark has served as the major advisor for students in the Environmental Sciences Program with a concentration in environmental toxicology and chemistry and in the Department of Veterinary & Animal Sciences. He advises approximately 15 students each year. He is a member of the Honors Program/Commonwealth College and supervises 1-2 honors research theses per year. He has mentored two Junior Fellows, Howard Hughes Undergraduate Research Fellowship Grant, Biology, University of Massachusetts-Amherst.

#### *Honors Undergraduate Theses- (17)*

Alfredo Canhoto, 1991. Effect of ATP on the Swimming Behavior of *Paramecium tetraurelia*. Biochemistry, University of Massachusetts-Amherst.

Sean J. Edman, 1993. Behavioral Effects of Deltamethrin, D595, Paraoxon, Chlordimeform and Abamectin on *Paramecium tetraurelia*. Chemistry, St. Olaf College, MN.

Brandon J. Brei, 1998. Potential for Age-grading *Anopheles stephensi* (Lisbon) (Diptera: Culicidae) by Gas-Chromatographic Analysis of Cuticular Hydrocarbons. Entomology, University of Massachusetts-Amherst.

Jessica J. Kraeft, 2000. Molecular Analysis of the Sex-linked Nature of Permethrin Resistance in Colorado Potato Beetle, *Leptinotarsa decemlineata*. Environmental Science/Microbiology, University of Massachusetts-Amherst.

Patricia Goon, 2000. Optimization of Polymerase Chain Reaction-Based Monitoring Techniques for the detection of Resistant Alleles from Colorado Potato Beetle Eggs and First Instars. Environmental Science, University of Massachusetts-Amherst.

Kim Lu, 2001. Action of Pyrethroids on Calcium Channels in the Rat Brain, Biology, University of Massachusetts-Amherst.

Anna Alves, 2007. Effect of Phorbol Esters on the Action of Deltamethrin on Heterologously Expressed Cav2.2. Biochemistry & Mol. Biol. University of Massachusetts-Amherst.

Bryan C. Poole, 2011. Assessing the Evolution of Knockdown Resistance in Egyptian Head Lice using Bioassay and Genotyping Techniques. A Capstone Experience. Biochemistry & Molecular Biology, University of Massachusetts-Amherst.

Erica Kaplan, 2011. Environmental Effects of Chemicals. A Capstone Experience Honors Thesis. Animal Sciences, Department of Veterinary & Animal Science, University of Massachusetts-Amherst.



Daniella Shriki, 2012. Assessing the Evolution of Knockdown Resistance in Egyptian Head Lice using Bioassay and Genotyping Techniques. A Capstone Experience Honors Thesis, Department of Biochemistry and Molecular Biology, University of Massachusetts-Amherst.

Andrew Fenton, 2012. Optimization of Vegetative Filter Strips to Mitigate Pesticide Runoff from Treated Turf. A Capstone Experience Honors Thesis, The Environmental Sciences Program, University of Massachusetts-Amherst.

Rebecca Bishop, 2013. Optimization of Vegetative Filter Strips for Mitigation of Runoff from Treated Turf. A Capstone Experience Honors Thesis. Department of Chemistry. University of Massachusetts-Amherst,

Kyle Gellatly, 2013. *Drosophila melanogaster* CYP4G1 is associated with DDT resistance by reduced penetration. A Capstone Experience Honors Thesis. Department of Biochemistry and Molecular Biology. University of Massachusetts-Amherst.

Michelle Kossack, 2013. Altering Ivermectin Toxicity in Head Lice through Synergism. A Capstone Experience Honors Thesis. Environmental Sciences Program. University of Massachusetts-Amherst.

Molly Morgan, 2014. Effects of DDT and DDE on Voltage-sensitive Sodium Channels expressed in Adult and Juvenile Rat Brain using P2-injected *Xenopus* Oocytes. A Capstone Experience Honors Thesis. Department of Veterinary and Animal Sciences, University of Massachusetts-Amherst.

Daniel Palenchar, 2014. Quantitative Sequencing for the Determination of *Kdr*-like Resistance Allele Frequencies in the Common Bed Bug, *Cimex lectularius*, Populations Collected from Israel. A Capstone Experience Honors Thesis. Department of Veterinary and Animal Sciences, University of Massachusetts-Amherst.

Josue Marquez-Garcia, 2018. Effects of DDT and DDE on Voltage-sensitive Sodium Channels expressed in PND15 Rat Brain using P2-injected *Xenopus* Oocytes. A Capstone Experience Honors Thesis. Department of Biology, University of Massachusetts-Amherst.

B. *Graduate* – Past and present graduate students advised, co-trained, or trained by Dr. Clark are listed below:

Matthew Brooks, M.S. Entomology, 1986, **trained**  
Christopher Geiger, M.S. Public Health, 1987, advised  
Joseph Argentine, M.S. Entomology, 1987, **trained**  
Ralph Charlton, Ph.D. Entomology, 1988, advised  
John Morgan, Ph.D. Chemistry, 1988, co-trained  
Peter Marken, M.S. Chemistry, 1988, co-trained  
Joanne Mei, M.S. Entomology, 1988, advised  
Karen Wilcock, Ph.D. Public Health, 1989, advised  
Pattamaporn Kittayapong, Ph.D. Entomology, 1986, co-trained  
Paula Martin, M.S. Entomology, 1989, advised  
Paul Gosselin, M.S. Env. Chemistry, 1990, co-trained  
Philip Kemp, Ph.D. Public Health, 1990, advised  
Joseph Argentine, Ph.D. Entomology, 1991, **trained**

Louis Scarano, Ph.D. Public Health, 1992, co-trained  
Joanne Mei, Ph.D. Entomology, 1992, advised  
William Dantzer, Ph.D. Food Science, 1993, advised  
Matthew Brooks, Ph.D. Chemistry, 1993, co-trained  
Paula Martin, Ph.D. Entomology, 1993, co-trained  
Kathryn Murphy, Ph.D. Chemistry, 1994, **trained**  
Christiane Gouamene, M.S. Entomology, 1994, **trained**  
Daniel Tessier, M.S. Entomology, 1994, **trained**  
Margaret McCarthy, Ph.D. Public Health, 1994, advised  
Mary Guttieri, Ph.D. Microbiology, 1995, advised  
Si Hyeock Lee, Ph.D. Entomology, 1996, **trained**  
Michael Desena, M.S. Entomology, 1996, co-trained  
Jeffery Doherty, M.S. Microbiology, 1998, co-trained  
Yong Wang, M.S. Entomology, 1997, advised  
Daniel Tessier, Ph.D. Entomology, 1998, **trained**  
Raymond Putnam, M.S. Entomology, 1999, **trained**  
Laura Harrington, Ph.D. Entomology, 1999, co-trained  
Miwa Takano, Ph.D. Entomology, 1999, advised  
Hu Xingping, Ph.D. Entomology, 1999, co-trained  
Gerard Roy, M.S., Entomology, 1999, **trained**  
Steven Symington, M.S. Entomology, 2000, **trained**  
Jessica Dunn, M.S. Entomology, 2000, **trained**  
Kyong-sup Yoon, M.S. Entomology, 2000, **trained**  
Scott Carrier, M.S. Entomology, 2000, **trained**  
Woojin Kim, Ph.D., Entomology, 2001, advised  
Kosea Frederick, M.S. Entomology, 2000, **trained**  
Raymond Putnam, Ph.D., Plant Biology, 2006, **trained**  
Steven Symington, Ph.D., Molecular & Cell Biology, 2004, **trained**  
Hyo Jeong Kim, Ph.D., Molecular & Cell Biology, 2004, **trained**  
Joseph Gozit. M.S. Enviro. Toxicology & Risk Assessment, Public Health, 2004, advised  
Kyong-Sup Yoon, Ph.D., Env. Toxicology & Risk Assessment, 2006, **trained**  
Robin Edwards, M.S., Env. Toxicology & Risk Assessment, current, **trained**  
Ben Gerade, M.S., Env. Toxicology & Risk Assessment, 2004, **trained**  
Richard K. Frisbie, M.S. Molecular & Cell Biology, 2006, **trained**  
Joseph P. Strycharz, M.S. VASCI, 2010, **trained**  
Kun Li, Ph.D., Plant & Soil Science, 2006, advised  
Lauren Moffit, Veterinary & Animal Science, 2008, advised  
Hillary E. Hodgdon, M.S. VASCI, 2008, **trained**  
Anna Alves, M.S. Molecular & Cell Biology, 2011, **trained**  
Dominic Previte, M.S. Molecular & Cellular Biology, 2012, **trained**  
Samuel Andrewes, M.S. Molecular & Cell Biology, 2014, **trained**  
Kyle Gellatly, M.S. Molecular & Cell Biology, 2015, **trained**  
Edwin Murenzi, M.S. Molecular & Cell Biology, 2016, **trained**  
Barbra DeFlorio, M.S. VASCI, 2108, **trained**

Jeffrey J. Doherty, Ph.D. VASCI, 2018, **trained**

Edwin Murenzi, Ph.D.. Molecular & Cell Biology, current, **trained**

Jake M. Zina, M.S., VASCI, current, **trained**

### M.S. Thesis Titles (21):

**Matthew W. Brooks.** 1986. Investigations of the action of type I and type II pyrethroids on norepinephrine uptake and release by rat brain synaptosomes. Entomology. University of Massachusetts – Amherst.

*Current Position* – CEO, AgChem Consultants, Arlington, VA.

**Joseph A. Argentine.** 1987. Population genetics of resistant management for the Colorado potato beetle. Entomology, University of Massachusetts – Amherst.

**Daniel M. Tessier.** 1994. Environmental degradation products of the herbicide alachlor: Quantitative assessment of mutagenic potential. Entomology, University of Massachusetts – Amherst.

**Christiane N. Gouamene Lamine.** 1994. Biochemical factors of resistance and management of Colorado potato beetle, *Leptinotarsa decemlineata* (Say), (Coleoptera: Chrysomelidae). Entomology, University of Massachusetts – Amherst.

*Current Position*- Chief Analyst, Palm Oil Institute, Ivory Coast, Africa

**Gerald R. Roy.** 1999. Hazard evaluation and management of volatile and dislodgeable foliar pesticide residues following application to turfgrass. Entomology, University of Massachusetts-Amherst.

*Current Position*-Environmental Health and Safety Eng. International Fuel Cells, Inc. South Winsor, CT.

**Raymond A. Putnam.** 1999. The environmental fate of pesticides applied to cranberry bogs. Entomology. University of Massachusetts-Amherst.

*Awards*- 1999 Graduate Student Poster Presentation Award, ACS/Agrochemicals Div., 218th Nat. Meeting, New Orleans, LA, 8-24-99.

*Current Position*- Chief Analyst and Laboratory Manager. MA. Pesticide Anal. Lab. CFNR. University of Massachusetts-Amherst.

**Jessica B. Dunn.** 2000. Detection of mutations in Colorado potato beetle acetylcholinesterase gene responsible for resistance to carbofuran. Entomology, University of Massachusetts-Amherst.

*Current Position*- Scientist II, Candidate synthesis evaluation and enhancement Dept. Drug Metabolism. Pfizer, Inc. Groton, CT 06340

**Steven B. Symington, Jr.** 2000. Characterization of the action of pyrethroids on the ciliary calcium channel of *Paramecium tetraurelia*. Entomology, University of Massachusetts-Amherst.

*Awards*-1998 Graduate Student Poster Presentation Award, ACS/Agrochemicals Div., 210<sup>th</sup> ACS Nat. Meeting, Boston, MA , 8-15-98.

-University Distinguished Teaching Award, University of Massachusetts-Amherst 2000.

**Kosea S. Frederick.** 2000. Toxicological evaluation of p,p'-DDT and its analogs on the calcium channel of the ciliate organism, *Paramecium tetraurelia*. Entomology, University of Massachusetts-Amherst.

*Current Position*- Scientist II, Candidate synthesis evaluation and enhancement Dept. Drug Metabolism. Pfizer, Inc. Groton, CT 06340

**Kyong-Sup Yoon.** 2001. Enhanced abamectin metabolism in chemically-induced populations of Colorado potato beetle, *Leptinotarsa decemlineata* (Say). Entomology, University of Massachusetts-Amherst.

*Awards*-2001 Graduate Student Poster Presentation Award, ACS/Agrochemicals Div., 222<sup>nd</sup> ACS Nat. Meeting, Chicago, IL, 8-28-01.

**Scott A. Carrier.** 2002. Turfgrass management practices to minimize potential volatile and dislodgeable foliar residues following pesticide applications. Entomology, University of Massachusetts-Amherst.

*Current Position*- Environmental Analytical Chemist, Vertex, Boston, MA

**Benjamin B. Gerade.** 2004. Age-grading Female *Aedes aegypti* using Cuticular Hydrocarbons. Environmental Toxicology & Risk Assessment, School of Public Health, University of Massachusetts-Amherst.

*Current Position*- Analytical Chemist, Wyeth Pharmaceutical Co. Boston, MA

**Richard K. Frisbie.** 2006. Action of pyrethroids alone and in binary mixtures at presynaptic nerve terminals from rat brain. Molecular & Cellular Biology, University of Massachusetts-Amherst.

*Current Position*-CVMED Lead Generation Group, Pfizer Global Research and Development, Pfizer, Inc., Groton, CT.

**Hilliary E. Hodgdon.** 2008. Binary mixtures of pyrethroids interact with voltage-sensitive calcium and chloride channels in isolated presynaptic nerve terminals from rat brain. Veterinary & Animal Science. University of Massachusetts-Amherst.

*Current Position*- Research Associate, EnVivo Pharmaceuticals, Watertown, MA

*Awards*-2007 Graduate Student Poster Presentation Award, ACS/Agrochemicals Div., 222<sup>nd</sup> ACS Nat. Meeting, Boston, MA, 9-21-07.

-2008 Poster Presentation Award (3<sup>rd</sup> place), International Pan-Pacific Conference on Pesticide Science, Honolulu, HI 6-3-08.

**Joseph P. Strycharz.** 2010. Polygenic resistance in the highly DDT-resistant strain of *Drosophila melanogaster* involves decreased penetration, increase metabolism, and direct excretion of DDT. Animal Science, University of Massachusetts-Amherst. Awards- 2008 Graduate Student Poster Presentation Award, ACS/AGRO, 224<sup>th</sup> ACS Nat. Meeting, Philadelphia, PA, 8-18-08.

**Anna-Maria F. Alves.** 2012. The pyrethroid deltamethrin, which causes choreoathetosis with salivation syndrome (CS-Syndrome), enhances calcium ion influx via phosphorylated CA<sub>v</sub>2.2 expressed in *Xenopus laevis* oocytes. Molecular & Cell Biology, University of Massachusetts-Amherst.

**Dominic J. Previte.** 2012. Investigation of differential vector competence of *Bartonella quintana* in human head and body lice. Molecular & Cell Biology, University of Massachusetts-Amherst.

**Samuel W. Andrewes.** 2014. Developing a behavioral bioassay to determine female head lice avoidance with formulated re-infestation deterrents. Molecular & Cell Biology, University of Massachusetts-Amherst.

**Kyle J. Gellatly.** 2015. RNAi validation of resistance genes and their interactions in the highly DDT-resistant 9I-R strain of *Drosophila melanogaster*. Molecular & Cell Biology, University of Massachusetts-Amherst.

**Edwin Murenzi.** 2017. Microtransplantation of rat brain neurolemma into *Xenopus laevis* oocytes to study the effect of environmental toxicants on endogenous voltage-sensitive channels. Molecular and Cellular Biology, University of Massachusetts-Amherst.

**Barbara A. DeFlorio.** 2017. Optimization of vegetative filter strips for mitigation of runoff from golf course turf. Animal Sciences. University of Massachusetts-Amherst,

### **Ph.D. Dissertation Titles (10):**

**Joseph A. Argentine.** 1991. Biochemistry and genetics of insecticide resistance in Colorado potato beetle. Entomology, University of Massachusetts – Amherst.

Awards – 1991 Young Scientist Award, Amer. Chem. Soc., Agrochemical Div.

Current Position – Senior Scientist, Insecticide Development Group, FMC, Princeton, NJ.

**Kathleen C. Murphy.** 1994. The determination of volatile and dislodgeable residues from pesticide-treated turfgrass and an assessment of human exposure. Chemistry, University of Massachusetts – Amherst.

Current Position – Assistant Professor, Department of Chemistry, Elms College, Springfield, MA.

**Si Hyeock Lee.** 1996. Multiple forms of carboxylesterases from *Leptinotarsa decemlineata*. Entomology, University of Massachusetts – Amherst.

*Awards* – 1995 Young Scientist Award, Amer. Chem. Soc., Agrochemical Div.

*Current Position* – Professor, Dept. of Molecular Entomology, Seoul National University, South Korea.

**Daniel M. Tessier.** 1997. Development of enzyme – linked immunosorbant assays for the detection of mutagenic metabolites of the herbicide alachlor. Entomology, University of Massachusetts – Amherst.

*Awards* – 1997 1<sup>st</sup> Runner-up Young Scientist Award, Amer. Chem. Soc., Agrochem. Div.

*Current Position* – Sr. Research Scientist, Dow AgroScience, Dover, DE.

**Hyo Jeong Kim.** 2004. Molecular and Functional Analysis of Mutations that Result in Insecticide Resistance in Colorado Potato Beetle. Molecular & Cell Biology, University of Massachusetts-Amherst.

*Awards*- 2004 Graduate Student Poster Presentation Award, ACS/Agrochemicals Div., 228<sup>th</sup> ACS Nat. Meeting, Philadelphia, PA, 8-24-04.

*Current Position*- Research Associate Professor, School of Medicine, UC Davis.

**Steven B. Symington.** 2005. Action of T- and CS-Syndrome Pyrethroids on Voltage-Sensitive Calcium Channels in Rat Brain. Molecular & Cellular Biology, University of Massachusetts-Amherst.

*Awards*- American Chemical Society, Agrochemicals Division, Young Scientist Research Recognition Award Finalist, 229<sup>th</sup> ACS National Meeting, San Diego, CA March 13-17, 2005.

*Current Position*- Associate Professor, Department of Biology, Salve Regina University, Newport, RI.

**Raymond A. Putnam.** 2006. Golfer Exposure to Turfgrass Pesticides. Environmental Toxicology and Risk Assessment, Public Health. University of Massachusetts-Amherst.

*Awards*- 2003 recipient of the Environmental Chemistry Graduate Student Award, presented by the American Chemical Society, Division of Environmental Chemistry, and the winner of the Graduate Student Poster Competition from the Agrochemicals Division of the American Chemical Society.

*Current Position*: Senior Scientist, Office of Pesticide Programs, District 1, USEPA, Boston, MA.

**Kyong Sup Yoon.** 2006. Detection and mechanism of resistance in the human head louse, *Pediculus capitis*. Environmental Toxicology & Risk Assessment, Public Health, University of Massachusetts-Amherst.

*Awards*: 2006 American Chemical Society, Agrochemical Division, Young Scientists Research Recognition Award, Runner-up. 2001 American Chemical Society, Agrochemical Division, Graduate Student Research Recognition Award.

2010 New Investigator Award, American Chemical Society, AGRO Division, 239<sup>th</sup> ACS national Meeting, San Francisco, CA, March 21-25, 2010.

*Current Position*: Assistant Professor, Department of Biological Sciences and Environmental Sciences Program. Southern Illinois University, Edwardsville, IL.

**Jeffrey J. Doherty.** 2017. Golfer Exposure to Pesticides. Animal Biotechnology and Biomedical Sciences Program, Veterinary & Animal Sciences, University of Massachusetts-Amherst.

*Awards:* Inducted into Phi Kappa Phi Honor Society April 9th 2017.

*Current Position:* Chief Analyst, Massachusetts Pesticide Analysis Laboratory, Post-doctoral Fellow, Department of Veterinary & Animal Sciences, University of Massachusetts-Amherst.

**Edwin Murenzi.** 2018. Effects of Type I and II pyrethroids on Voltage-sensitive Sodium Channels expressed in Adult and Juvenile Rat Brain using P2-injected *Xenopus* Oocytes. Molecular & Cellular Biology Program, University of Massachusetts-Amherst.

C. *Postdoctoral Research Associates and Visiting Research Scholars (20):*

Dr. Feng Guo-lei, Ph.D. Professor, Dept. of Entomology, Inst. of Zoology, Academia Sinica, Beijing, P.R. China. 1986-88.

Dr. Hao Lin, Ph.D. Professor, Shanghai Inst. of Entomology, Shanghai, P.R. China. 1989-91.

Dr. Kun Yan Zhu, Ph.D. Research Associate, 1992-94: Research Assoc. Professor, 1994-95. Dr. Zhu holds a Ph.D. from Utah State University and is currently an Associate Professor of Entomology at Kansas State University.

Dr. Mugeng Jiang, Ph.D. Professor and Chairman, Organic Chemistry Dept., Nanjing Agricultural Univ., Nanjing, P.R. China. 1993-94.

Dr. Yunje Kim, Ph.D. Research Scientist, Doping Control Center, Korean Inst. of Science and Technology (KIST), Seoul, South Korea. 1995-96.

Dr. Aiguo Zhang, Ph.D. Research Associate. 1997-99. Dr. Zhang holds a Ph.D. from Simon Fraser University, BC, Canada. He is presently a staff scientist at Bio Rad Corp. Berkely, CA.

Dr. Si Hyeock Lee, Ph.D. Research Assistant Professor. 1999-2001. Dr. Lee holds a Ph.D. from the University of Massachusetts, Amherst. He is presently an associate professor of molecular entomology at Seoul National University, South Korea.

Dr. Jian-Rong Gao, Ph.D. Research Associate, 2001-2004. Dr. Gao holds a Ph.D. from Kansas State University. He is currently a post-doctorate fellow in the Department of Entomology, Cornell University.

Dr. Lihong Qiu, Ph.D. Visiting Research Professor, China Agricultural University, Beijing, P.R. China, 2002-2003.

Dr. Katy Euliss Smith, Ph.D. Research Associate, 2005-06. She is currently a research soil scientist, National Soil Dynamic Laboratory, USDA-ARS, Auburn, AL.

Dr. Si Hyeock Lee, Ph.D. Visiting Scientist, Sabbatical Leave. 2007, 2008, 2011. Dr. Lee holds a Ph.D. from the University of Massachusetts, Amherst. He is presently an associate professor of molecular entomology at Seoul National University, South Korea.

Dr. Gamal Aboelghar, Ph.D. Visiting Scientist, 2007 and 2008. Dr. Aboelghar is a Professor of Pesticide Science at Menoufiya University, Egypt.

Dr. Deok Ho Kwon, Ph.D. Visiting Scientist, 2008, Post Doctoral Fellow, Brain Korea 21 Program, Seoul National University, South Korea.

Dr. Gamal Aboelghar, Ph.D. Visiting Scientist, 2012. Dr. Aboelghar is a Professor of Pesticide Science at Menoufiya University, Egypt.

Ms. Ju Hyong Kim, M.S. Visiting Scientist, 2008, Pre-Doctoral Fellow, Brain Korea 21 Program, Seoul National University, South Korea.

Dr. Ju Hyong Kim, Ph.D. 2015-2018. VASCI.

Dr. Kyong Sup Yoon, Ph.D. Visiting Scientist, Sabbatical Leave. 2016. Dr. Yoon holds a Ph.D. from the University of Massachusetts, Amherst. He is presently an assistant professor in the Department of Biological Science and Environmental Sciences Program, Southern Illinois University-Edwardsville.

Dr. Steven B. Symington, Ph.D. Visiting Scientist, Sabbatical Leave. 2016. Dr. Symington holds a Ph.D. from the University of Massachusetts, Amherst. He is presently an associate professor in the Department of Biology and Biomedical Sciences, Salve Regina University, Newport, RI, USA.

Mr. Andres Garcia De la Filia. 2017. Visiting Scientist, University of Edinburg, Scotland (Professor Linda Ross's Laboratory).

Dr. Jeffrey J. Doherty, Ph.D. 2017-present. Post-Doctoral Fellow, VASCI.

Dr. Jonghwa Lee, Ph.D. 2018-present. Post-Doctoral Fellow, VASCI



## **PUBLICATIONS:**

**Total publications: 493**  
**Books/Special Issues: 12**  
**Book chapters: 39 (23 refereed)**  
**Refereed: 221 (198 +23)**  
**Non-Refereed: 244**

<https://www.ncbi.nlm.nih.gov/sites/myncbi/1xSVxjvDjapoDP/bibliography/55163479/public/?sort=date&direction=ascending>

- **166 Insect/Invertebrate Toxicology**
- **41 Vertebrate/Mammalian Toxicology**
- **41 Environmental Chemistry**

## **Books and Special Issue Journals (12):**

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2. Molecular Action of Insecticides on Ion Channels. 1995. Editor, J. Marshall Clark. ACS Symposium Series 591, ACS Books, Washington, D.C. pp. 1-356.
3. Fate of Turfgrass Chemicals and Pest Management Approaches. 1999. Editors J.M. Clark and M.P. Kenna. ACS Symposium Series 743, ACS Books, Washington D.C. pp. 1-431.
4. Agrochemical Resistance: Extent, Mechanism, and Detection. 2001. Editors J.M. Clark and I. Yamaguchi. ACS Symposium Series 808, ACS Books, Washington D.C. pp.1-290.
5. New Discoveries in Agrochemicals. 2005. Editors J.M. Clark and H. Ohkawa. ACS Symposium Series 892, ACS Books, Washington D.C. pp. 1-425.
6. Environmental Fate & Safety Management of Agrochemicals. 2005. Editors, J.M. Clark and H. Ohkawa. ACS Symposium Series 899, ACS Books, Washington D.C. pp. 1-357.
7. Advances in Human Vector Control. 2009. Editors, J.M. Clark, J.R. Bloomquist, H. Kawada. ACS Symposium Series 1014. ACS Books, Washington D.C. pp. 1-241.
8. Advances in Vector and Urban Pest Management and Resistance. 2013. Guest Editors, T.D. Anderson, J.R. Bloomquist, J.M. Clark, D.M. Soderlund. Special Issue. Pesticide Biochemistry & Physiology, Volume 106 (3), pp. 1-197.
9. Mode of Action of Environmental Pollutants and Insecticides. 2015. Guest Editors, I. Yamaguchi, J.M. Clark, K. Tanaka, J.G. Scott. Special Issue. Pesticide Biochemistry & Physiology, Volume 120, pp. 1-132.
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11. Insecticide Toxicology in China. 2016. Guest Editors, K.Z. Zhu, X. Gao, Z. Han. EIC, J.M. Clark. Special Issue. Pesticide Biochemistry & Physiology, Volume 132, pp. 1-131.
12. Advances in Biorational Control of Medical and Veterinary Pests. 2018. Editors, E. Norris, J. Coats, A. Gross, J. Clark. ACS Symposium Series 1289, ACS Books, Washington D.C. in press.

### **Book Chapters and Review Articles (39):** (\*Refereed 23)

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- 5.\* Matsumura, F. and Clark, J. M. 1989. "Effects of Pyrethroids on Neural Protein Kinases and Phosphatases of the Squid Optic Lobe." In, Molecular Basis of Drug and Pesticide Action. Ed. G.G. Lunt. Elsevier Sci. Publ. Neurotox. 88, BC (Biomed. Div.), New York, N.Y. pp. 235-244.
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- 8.\* Clark, J.M., Marion, J.R. and Tessier, D.M. "Effect of Spray Adjuvant on Off-site Airborne and Deposited Parathion from Cranberry Bogs treated by Aerial Application and Chemical Irrigation" In, Fate and Significance of Pesticides in Urban Environments. Eds. K.D. Racke and A.R. Leslie, Amer. Chem. Soc. Symposium Series, ACS Press, 1993, 243-259.
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- 29.\* Lee, S.H., Clark, J.M., Yoon, K.S., Kwon, D.H., Hodgdon, H.E., and Seong, G.M. "Resistance Management of the Human Head Louse Using Molecular Tools," In, Advances in Human Vector Control, Eds. J.M. Clark, J.R. Bloomquist, H. Kawada, ACS Symposium Series 1014, ACS Books, Washington D.C. 2009, pg.203-215.
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34. Clark, J. M. and Symington, S.B. Advances in the Mode of Action of Pyrethroids. In, Pyrethroids: From Cysanthemum to Modern Industrial Insecticide. Topics in Current Chemistry 314, Eds. N. Matsuo & T Mori, Springer-Verlag, Berlin, 2012, pp. 49-72.
- 35.\* Pittendrigh, B.R., Margam, V., Walters, K., Steele, L.D., Olds, B.P., Sun, W., Huesing, J., Lee, S.H., and Clark, J.M. In Insect Resistance Management, 2nd Edition, Ed. D. Onstad. Chapter 3. Understanding resistance and induced responses of insects to xenobiotics and insecticides in the age of omics and system biology, Elsevier, 2012, pg. 1-57.
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- 37.\* Clark, J.M., Kim, J.H., Yoon, K.S., Pittendrigh, B.R., and Lee, S.H. Overcoming Insecticide Resistance: Proactive Detection and Management of Insecticide-resistant human lice. In Advances in the Biorational Control of Medical and Veterinary Pests, Eds. E. Norris, J. Coats, A. Gross, J. Clark. ACS Symposium Series 1289, ACS Books, Washington D.C. in press.
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46. Clark, J.M. and J. Doherty. 2006. Managing Pesticide Exposure from Treated Turf. 2005 Turfgrass and Environmental Research Summary. USGA, Far Hills, NJ., pg: 35.
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58. Clark, J.M.. Optimization of vegetative filter strips for mitigation of runoff from golf course turf. "University of Massachusetts Turf Research Field Day Program", 2009, Pages 187-189.
59. Clark, J.M., Putnam, R.A., Doherty, J.J.. Utilizing reduced risk pesticides and IPM strategies to mitigate golfer exposure and hazard. "University of Massachusetts Turf Research Field Day Program", 2009, Pages 185-186.
60. Clark, J., Putnam, R. Doherty, J.. Utilizing reduced-risk pesticides and IPM strategies to mitigate golfer exposure and hazard. "2008 USGA Turfgrass and Environmental Research Summary", 2009,



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62. Clark, J.M., Doherty, J., Lanza, G., Parkash, O.. Optimization of vegetative filter strips for mitigation of runoff from golf course turf: Site establishment. "2009 USGA Turfgrass and Environmental Research Summary", 2010, Page 41.
63. Clark, J.M., Putnam, R.A., Doherty, J.J.. Utilizing reduced risk pesticides and IPM strategies to mitigate golfer exposure and hazard. "University of Massachusetts Turf Research Field Day Program", 2010, Pages 188-190
64. Clark, J.M.. Optimization of vegetative filter strips for mitigation of runoff from golf course turf. "University of Massachusetts Turf Research Field Day Program", 2010, Pages 180-182.
65. Doherty, J.J. and Clark, J.M. Utilizing reduced-risk pesticides and IPM Strategies to mitigate golfer exposure and hazard. "USGA Turfgrass and Environmental Research Online", vol. 10, number 15, 2011, pp.1-18.
66. Clark, J.M., Doherty, J., Lanza, G., Parkash, O. Optimization of vegetative filter strips for mitigation of runoff from golf course turf: Site establishment. "2010 USGA Turfgrass and Environmental Research Summary", 2011, Page 42.
67. DeFlorio, B., Clark, J.M., Doherty, J.J., Lanza, G.R., and Parkash. O. Optimization of vegetative filter strips for mitigation of runoff from golf course turf. "University of Massachusetts Turf Research Field Day Program", 2011, pp.107-109.
68. Clark, J.M., Putnam, R.A., Doherty, J.J.. Utilizing reduced risk pesticides and IPM strategies to mitigate golfer exposure and hazard. "University of Massachusetts Turf Research Field Day Program", 2011, pp. 103-105.
69. Clark, J.M. and Doherty, J.J. Utilizing reduced risk pesticides and IPM strategies to mitigate golfer exposure and hazard. "2010 USGA Turfgrass and Environmental Research Summary", 2011, Page 44.

### **INVITED LECTURES, POSTERS AND PAPERS PRESENTED (169):**

1. Paper, ESA, North Central Branch Meeting, Denver, CO. 3/20/75-3/23/75. "Metabolism of Toxaphene in Aquatic Sediments."
2. Paper, ESA, North Central Branch Meeting, Lincoln, NE. 3/15/80-3/19/80. "Effect of Pyrethroids on Neural ATPases of the Squid, *Loligo pealei*."
3. Invited Lecture, Department of Entomology, Ohio State University, Columbus, OH. 8/10/80-8/12/80. "Pyrethroid Inhibition of Neural ATPases."

4. Paper, ESA, National Meeting, Atlanta, GA. 11/30/80-12/4/80. "Pyrethroid Inhibition of Neural ATPases from the Cockroach Brain."
5. Invited Lecture, Department of Entomology, University of Massachusetts, Amherst, MA. 1/19/81-1/21/81. "Pyrethroid Inhibition of Neural ATPases."
6. Invited Lecture, Institute of Physical and Chemical Research, Siatami, Japan. 8/31/82. "The Action of Pyrethroids on Calcium Regulatory Mechanisms in the Nervous System of the Squid, *Loligo pealei*."
7. Poster, ESA, Eastern Branch Meeting, Hartford, CT. 9/29/82-10/1/82. "Pyrethroid Inhibition of Neural ATPases and Physiological Implications of Calcium Regulations."
8. Poster, ESA, National Meeting, Toronto, Ont. 11/29/82-12/3/82. "Pyrethroid Inhibition of Neural ATPases and Possible Physiological Implications on Calcium Transport."
9. Invited Lecture, Department of Environmental Science, University of Massachusetts, Amherst, MA, 4/9/83. "Novel Approaches to Insecticide Control."
10. Invited Lecture, Shell Development Company, Biological Science Research Center, Modesto, CA. 4/12/83-4/15/83. "Pyrethroid Inhibition of Neural ATPases and Physiological Implications on Calcium Transport in the Nerve."
11. Invited Lecture, Molecular and Cellular Biology Colloquia, University of Massachusetts, Amherst, MA. 11/7/83. "The Role of Ca<sup>2+</sup> Homeostasis in Insecticidal Action."
12. Poster, ESA, National Meeting, Detroit, MI. 11/28/83-12/2/84. "The Stimulatory Action of DDT on Na<sup>+</sup> Flux via Sodium Channels Reconstituted from Lobster Walking Leg Nerve."
13. Invited Poster, 3rd International Conference on NeuroToxicology of Selected Chemicals, 9/9-12/84 Little Rock, AK. "Investigations on the Suitability of using Nerve Membrane Fragments Incorporated into Artificial Liposomes as a Method for the Study of Pesticidal Action on Sodium Channel Activity."
14. Paper, ESA, National Meeting, Miami, FL. 12/9/85. "The Genetics and Mechanisms of Insecticide Resistance in Colorado Potato Beetle to Azinphosmethyl and Permethrin."
15. Paper, ESA, National Meeting, Reno, NV, 12/7-11/86. "Computer Simulation Model of Insecticide Rotation and Mixture Strategies in Resistance Development of Colorado Potato Beetle."
16. Poster, ESA National Conference, Boston, MA, 11/30-12/4/87. "Biochemical and Behavioral Differences between Suspected Malaria Vector and Non-Vector Forms of *Anopheles maculatus* Complex."
17. Invited Lecture, Department of Entomology, Univ. of Maryland, 9/28/88. "Enhanced Release of Neurotransmitters by Pyrethroid Insecticides."
18. Invited Lecture, Department of Environmental Toxicology, Univ. of Calif.-Davis, 3/24/88. "Neuropharmacology of Pyrethroid Toxicity."

19. Invited Symposium Paper, ESA, National Meeting, Boston, MA, 12/1/88. "Genetics and Biochemistry of Insecticide Resistance in Colorado Potato Beetle."
20. Paper, ESA, National Meeting, Boston, MA, 12/1/88. "Genetic Characterization of Azinphosmethyl and Permethrin Resistance in Four Strains of Colorado Potato Beetle."
21. Invited Lecture, Department of Entomology, Rutgers University, 12/2/88. "The Role of Ion-Channel Directed Neurotoxins on Enhanced Neurotransmitter Release."
22. Paper, ESA, Natl. meeting, San Antonio, TX, 12/10-14/1989. "Presynaptic Action of Deltamethrin on Susceptible and DDT (Kdr-Resistant) Houseflies."
23. Invited symposium paper, Environmental Neural Toxicology. SETAC 11th Annual Meeting, 11/11-14-90 Washington, D.C. "Enhancement of Neurotransmitter Release from Vertebrate and Invertebrate Synaptosomes by Ion Channel-Directed Neurotoxins."
24. Poster, ESA Natl. Meeting, New Orleans, LA. 12/2-6-90. "Abamectin Resistance in Colorado Potato Beetle."
25. Paper, ESA Natl. Meeting, New Orleans, LA. 12/2-6/90. "Biochemistry of Azinphosmethyl and Permethrin Resistance in Colorado Potato Beetle."
26. Invited Lecture. Environmental Engineering Program, Dept. of Civil Eng. UMASS, Amherst. 10/15/90. "Mitigation of Airborne Parathion Residues from Cranberry Bog Environments using a Spreader-Sticker Spray Additive."
27. Invited Lecture. Division of Biology, Kansas State University, Manhattan, KS. 5/10/91. "The Neurotoxicity of Ion-Channel Directed Insecticides."
28. Invited Symposium Paper, Environmental Neural Toxicology, 12th Ann. Meeting, Society of Environmental Toxicology and Chemistry, 11/3-7/91, Seattle, WA. "Neurotoxicity of Pyrethroid Insecticides in Invertebrates."
29. Invited Symposium Paper. "Mechanisms of Abamectin Resistance in the Colorado Potato Beetle." Symposium on Molecular Mechanisms of Insecticide Resistance: Diversity Among Insects. 202nd ACS Natl. Meet., New York, NY. 8/29/91.
30. Invited Platform Paper, Pesticide Resistance and Resistance Management Session, International Conference on Potato Pest Management, 10/12-17/91, Jackson Hole, WY. "Biochemical Mechanisms of Insecticide Resistance in the Colorado Potato Beetle."
31. Invited Symposium Paper, ACS Symposium, Fate and Significance of Pesticides in Urban Environments. 5/5-10/92, San Francisco, CA. "Sampling and Analysis of Airborne Parathion Residues from Treated Cranberry Bog Environments Bordering Suburban Areas."
32. Poster, 204th ACS National Meeting, Washington, D.C. 8/24/92. "Comparison of Solid-Phase Disk Extraction to Liquid-Liquid Extraction for EPA Methods 507 and 508." Presentation by M.W. Brooks.

33. Invited Symposium Paper. ACS Symposium, Toxicology, Mode of Action, and Resistance Management of the Avermectins. 204th ACS Natl. Meet., Washington, D.C. 8/27/92. "Resistance to Abamectin in Colorado Potato Beetle."
34. Invited Symposium Paper. ESA Symposium, Putting Genes to Work: Application for New Genetic Techniques. ESA Natl. Meeting, Dallas, TX. 12/15/94. "Biochemical and Molecular Aspects of Altered Acetylcholinesterase Conferring Azinphosmethyl Resistance in Colorado Potato Beetle."
35. Invited Lecture. 1995 Paul Dahm Memorial Lecture. Iowa State University, Ames, IA. 5/1/95. "Colorado Potato Beetle: The Lean, Mean, Resistance Machine."
36. Invited Lecture. Env. Health Hazards of Agrochem. Seminar Series, Dept. of Env. Toxicol., UC-Davis. 3/14/96. "Detection and Monitoring of Mutagenic Metabolites of Alachlor in the Environment."
37. Invited Symposium Paper. Int. Award for Research in Agrochemicals, ACS Symposium Honoring G. Voss, 211st ACS Nat. Meeting, New Orleans, LA, 3/25/96. "Insecticides as Tools in Probing Vital Receptors and Enzymes in the Nervous System."
38. Poster Presentation, Second World Congress, SETAC, Vancouver, B.C. Canada, 11/3/95. "Action of Insecticides on Calcium Channels of *Paramecium tetraurelia*."
39. Invited Lecture. 66th Mass. Turfgrass Conference and 21st Trade Show. Boston, MA, 1/14/97. "Where Do Pesticides Go: Golfer Exposure Issues."
40. Invited Lecture. Dept. of Plant Science, Univ. of Rhode Island, Kingston, RI, 3/10/97. "Pesticide Stability in Managed Landscapes."
41. Invited Symposium Paper. ACS, Div. of Agrochem. Immunochemistry Summit VI. 215<sup>th</sup> Natl. Meeting, Las Vegas, NV. 9/9/97. "Development of a cELISA for the Detection of Mutagenic Metabolites of the Herbicide Alachlor."
42. Invited Lecture. Dept. of Entomology, Kansas State Univ., Manhattan KS, 9/19/97. "Resistance to Permethrin by Colorado Potato Beetle."
44. Invited Lecture. Dept. of Entomology and Env. Sci., Univ. of Maine, Orono, ME, 10/3/97. "Molecular Biology of Insecticide Resistance Mechanisms in Colorado Potato Beetle."
45. Invited Lecture. Pyrethroid Working Group, AgrEvo, Wilmington, DE, 9/30/98. "Alternative Sites of Action for Pyrethroids."
46. Invited Symposium Paper. 2<sup>nd</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 10/24-27/99. "Mechanisms and Diagnostic Procedures for Resistance Management of Colorado Potato Beetle."
47. Invited Conference Speaker. Mechanisms and Diagnostic Procedures for Resistance Management of Insecticides. Pesticide Resistance, 2<sup>nd</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 10/24-27/99.

48. Invited Symposium Speaker, Mechanisms and Diagnostic Procedures for Resistance Management of Insecticide Resistance. Symposium Honoring Dr. G.P. Georgiou, International Award for Research in Agrochemicals, Amer. Chem. Soc., Div. of Agrochem., 219th ACS National Meeting, San Francisco, CA, 3/26-30/00.
49. Invited Departmental Speaker. Molecular Approaches to Resistance Management. Department of Entomology, Michigan State University, East Lansing, MI, 9-13-99.
50. Invited Colloquium Speaker. What to Do When Pesticides Fail: Molecular Resistance Management. Molecular and Cellular Biology Graduate Program, Univ. of Mass-Amherst, 11-29-99.
51. Invited Departmental Speaker. Mechanisms and Diagnostics for Resistance Management. Department of Entomology, Univ. of Calif.-Davis, 3-22-00.
52. Invited Departmental Speaker. Potential Exposure Routes to Golfers from Turfgrass Pesticides. Department of Plant Science, Univ. of Rhode Island, Kingston, RI, 4-6-00.
53. Invited Departmental Speaker. Mechanisms of Resistance and Diagnostic Procedures for Management. Department of Entomology, Virginia Tech, Blacksburg, VA, 4-13-00.
54. Poster Presentation. Detection of Mutagenic Metabolites of Alachlor by cELISA. 2<sup>nd</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 10/24-27/99.
55. Poster Presentation. Structure-Activity Relationship of DDT and Pyrethroids on the Voltage-sensitive Calcium Channel of *Paramecium*. SETAC 20th Annual Meeting, Philadelphia, PA, 11/14-18/99.
56. Poster Presentation. Pesticide Contamination of Surface and Drinking Water from Cranberry Cultivation in Massachusetts. SETAC 20th Annual Meeting, Philadelphia, PA, 11/14-18/99.
57. Invited Poster Presentation. DNA-based Genotyping Techniques for the Detection of Point Mutations associated with Insecticide Resistance in Colorado Potato Beetle. Insect Toxicology 2000, U. of California-Berkeley.
58. Poster Presentation. Preliminary Assessment of the Demethylation Inhibiting Fungicides applied to Turfgrass utilizing Three Application Techniques. SETAC 20th Annual Meeting, Philadelphia, PA, 11/14-18/99.
59. Poster Presentation. Molecular Analysis of the Sex-linked Nature of Permethrin Resistance in the Colorado Potato Beetle, *Leptinotarsa decemlineata*. Junior Fellow Honor Symposium, Capitol, Boston, MA 4-28-00.
60. Paper, Field Evaluation of Cuticular Hydrocarbons for Age- grading *Aedes aegypti*. 2000 Joint Annual Meeting, ESA/ESC/ESQ. Montreal, Quebec, Canada. 12/3-6/00.
61. Poster Presentation. DNA-based Genotyping for the Detection of Point Mutations associated with Insecticide Resistance in Colorado Potato Beetle. 2000 Joint Annual Meeting, ESA/ESC/ESQ. Montreal, Quebec, Canada. 12-3-6/00.

62. Poster Presentation. Effect of Pyrethroids on Voltage-sensitive Calcium Channel in the Rat Brain. Junior Fellow Honor Symposium, Sturbridge, MA, 4-19-01.
63. Invited Departmental Speaker. Dosimetry and Biomonitoring of Golfers following Turfgrass Pesticide Application. Department of Plant Science, Univ. of Rhode Island, Kingston, RI, 4-19-01.
64. Invited Symposium Speaker, Agrochemical Fate in Increasingly Urbanized Environments. Symposium Honoring Dr. R.O. Mumma, International Award for Research in Agrochemicals, Amer. Chem. Soc., Div. of Agrochem., 222th ACS National Meeting, Chicago, IL, 8/26-30/01.
65. Invited International Symposium Speaker, Analysis of Aquatic Ecotoxicological Effects: The *Paramecium* Model. Simposio Internacional Sobre Tecnologias de Apoio a Gestao de Recursos Hidricos, Joao Pessoa, Brazil, 7/10-13/01.
66. Invited International Symposium Speaker, Resistance Status of Pyrethroid Insecticides. International Symposium of Natural Pesticides from Forest Resources, Korea Forest Research Institute, Seoul, Korea, 10/8-10/01.
67. Invited Symposium Speaker, Insect Molecular Diagnostics and Resistance Management, Management of Insecticide Resistance in Medically Important Insects in Memory of George P. Georghiou. ESA Annual Meeting, San Diego, CA, 12/9-12/01.
68. Poster Presentation. Development of an Artificial Membrane Feeding System to Sustain the Human Head Louse (*Pediculus capitis*). ESA Annual Meeting, San Diego, CA, 12/9-12/01.
69. Invited Seminar Speaker. Penetration of Insecticides via Insect Cuticle. Cambria Bioscience LCC, Boston, MA 4-20-01.
70. Invited Panel Member. Alternative Mechanisms of Action for Pyrethroid Insecticides. Pyrethroid Working Group Presentation, USEPA, Washington, DC, 11-14-00.
71. Invited Departmental Seminar Speaker, Exposure of Golfers to Turfgrass Pesticides. Department of Plant Science, Univ. of Rhode Island, Kingston, RI, 4-19-01.
72. Invited SPHHS Assembly Speaker, Human Exposure to Turf Pesticides. School of Public Health and Health Sciences, University of Massachusetts-Amherst, 9-21-01.
73. Invited Symposium Speaker, A High-throughput Neurotoxicological Screen based on Brain Synaptosomes in the Assessment of Potential Target Sites in Insects and Mammals. FMC Corp., Princeton, NJ, 10-18-01.
74. Invited Departmental Seminar Speaker, Insecticide Resistance in the Human Head Louse. Department of Entomology, University of Maryland, College Park, MD. 11-26-01.
75. Poster, Development of an Artificial Membrane Feeding System to Sustain the Human Head Louse *Pediculus capitis*. Ann. Meeting of the Entomological Society of America, San Diego, CA. 12/9-12/01.

76. Invited Departmental Seminar Speaker, Insecticides as Tools for Probing Vital Enzymes and Receptors. Interview for the Mumma Endowed Professorship, Department of Entomology, The Pennsylvania State University, State College, PA. 4/15-17/02.
77. Invited Departmental Seminar Speaker, Mechanisms of Permethrin Resistance in the Human Head Louse, *Pediculus capitis*, and Resistance Management. Department of Biology, University of Maine, Orono, ME. 4-5-02.
78. Invited Departmental Seminar Speaker, Molecular Approaches to the Study of Environmental Toxicology and Chemistry. Department of Veterinary and Animal Science, University of Massachusetts, Amherst, MA. 4-24-02.
79. Invited Departmental Seminar Speaker, Dosimetry and Biomonitoring of Golfers Exposed to Pesticide-treated Turf. Department of Environmental Science, University of Rhode Island, Kingston, RI. 4-25-02.
80. Invited Symposium Speaker, International Award for Research in Agrochemicals: Dr. Hideo Ohkawa. Target Site Sensitivity and Insecticide Resistance. 226<sup>th</sup> ACS National Meeting, New York, NY. 9-8-03.
81. Invited Plenary Speaker, International Award for Research in Agrochemicals: Dr. J. Marshall Clark. Challenges and Future of Pesticide Toxicology. 226<sup>th</sup> ACS National Meeting, Philadelphia, PA. 8-23-04.
82. Invited Speaker, Effects of Pyrethroids on Rat Brain Calcium Channels, DuPont Crop Protection Division, Stine-Haskell Research Center, Newark, DE, 8-27-04.
83. Invited Symposium Speaker, International Award for Research in Agrochemicals: Robert Krieger. Dosimetry and Biomonitoring of Golfers following Pesticide Exposure. 229<sup>th</sup> ACS National Meeting, San Diego, CA. 3-14-05.
84. Invited Symposium Speaker, "Agrochemical Issues in Urban Environments". Golfer Exposure to Turfgrass Pesticides. 227<sup>th</sup> ACS Meeting, Anaheim, CA. 3-29-04.
85. Invited Departmental Speaker, Pediculosis: Send Lawyers, Guns and Money. Department of Biology, University of Utah, Salt Lake, UT, 10-13-06.
86. Invited Departmental Speaker. Insecticide Resistance in Human Head Lice. Department of Entomology, Purdue University, West Lafayette, IN. 10-20-05.
87. Invited Departmental Speaker. Head Lice, Pediculosis and Pesticides, Oh My! Department of Pharmacology & Toxicology, University of Rhode Island, RI. 11-2-05.
88. Invited Symposium Speaker, International Award for Research in Agrochemicals: Joel Coats. The Pyrethrins: The Never Ending Story. 231<sup>st</sup> ACS National Meeting, Atlanta, GA . 3-27-06.
89. Invited Symposium Speaker, Pyrethroid Action at Calcium Channels: Neurotoxicological Implications. 11<sup>th</sup> IUPAC Satellite Symposium "Frontiers in Molecular Neurotoxicology," Kinki University, Nara, Japan. 8-3-06.

90. Invited International Symposium Speaker, "Control of Pediculosis: Current and Future Needs." 11<sup>th</sup> IUPAC International Congress of Pesticide Chemistry, Kobe, Japan, 8-8-06.
91. Invited International Symposium Speaker. "Control of pediculosis: Status of resistance and monitoring." 3<sup>rd</sup> International Congress on Phthiraptera, Buenos Aires, Argentina, 10/16-20/06.
92. Invited International Award Symposium Speaker. "Recreational Exposure to Chlorothalonil following Application to Turfgrass." ACS International Award for Research in Agrochemicals in Honor of Dr. Isamu Yamaguchi: Fungicides. 232<sup>nd</sup> American Chemical Society Meeting, Division of Agrochem. San Francisco, 9/11/06.
93. Invited Symposium Speaker. International Award for Research in Agrochemicals: G.T. Brooks. Pyrethroid Action on Calcium Channels: Neurotoxicological Implications. 233<sup>rd</sup> American Chemical Society Meeting, Division of Agrochem. Chicago, March 27, 2007.
94. Invited International Symposium Speaker. "Golfer Exposure to Pesticide Treated Turf." 2007 Canadian International Turfgrass Conference & Trade Show. Montreal, Quebec. 3-5-07.
95. Invited International Platform Speaker. "Human head lice: Status, control and resistance." 4<sup>th</sup> pan-pacific Conference on Pesticide Science, Honolulu, HI, 6/1-5/08.
96. Invited International Platform Speaker. "Auxiliary mutations modify the effects of mutations causing target-site insensitivity and may have ramifications in resistance management." 4<sup>th</sup> pan-pacific Conference on Pesticide Science, Honolulu, HI, 6/1-5/08.
97. Invited International Awards Symposium Speaker. PKC-phosphorylations modify the action of CS-syndrome pyrethroids on rat brain N-type ( $Ca_v2.2$ ) voltage-sensitive calcium channels. ACS 236<sup>th</sup> National Meeting, Division of Agrochem., Philadelphia, PA, 8/19/08.
98. Invited Departmental Seminar Speaker. "Human Head Lice; Status, Control and Management. Department of Entomology, University of Maryland, College Park, MD. 4/17/2008.
99. Invited Symposium Speaker. "The Human Body Louse Genome Project", In Celebrating the Role of Entomology in the Genomics Revolution. 57<sup>th</sup> Annual Meeting of the Entomological Society of America, Indianapolis, IN, 12/16/09.
100. Invited Symposium Speaker, "Monitoring of Permethrin Resistance in Human Head Louse Populations", 3<sup>rd</sup> Nordic Head Louse Conference, Swedish Institute for Infectious Diseases, Stockholm, Sweden. 11/17/2008.
101. Invited Platform Speaker, "Determining golfer exposure & hazard to pesticides". 2009 Canadian International Turfgrass Conference & Trade Show, Halifax, Nova Scotia. 3/7/2009.
102. Invited Departmental Seminar Speaker. "Pediculus Lice: Pediculosis, Pestilence and Pesticides", Department of Entomology, University of Illinois, Urbana/Champlain, IL, 10-12-09.



103. Invited Departmental Seminar Speaker. “Residential Exposure and Hazard Assessment to Turfgrass Pesticides”. Department of Civil and Environmental Engineering, University of Massachusetts, Amherst, MA. 11/6/09.
104. Invited Conference Speaker, “Decreased number of detoxification genes makes the human body louse an efficient model to study xenobiotic metabolism and insecticide resistance.” 4<sup>th</sup> Int. Conf. on Phthiraptera, Urgup, Cappadocia, Turkey, 6/13-18, 2010.
105. Invited Conference Speaker, “Assessing resistance to pediculicides using *in vitro* rearing in conjunction with a hair tuft bioassay and molecular techniques.” 4<sup>th</sup> Int. Conf. on Phthiraptera, Urgup, Cappadocia, Turkey, 6/13-18, 2010.
106. Invited Symposium Speaker, “Brief exposures of human body lice to sub-lethal amounts of ivermectin over transcribes detoxification genes involved in tolerance”. The Third International Symposium on Insect Physiology, Biochemistry and Molecular Biology, Shanghai, China, 7/2/2011.
107. Invited Symposium Speaker, “Molecular mechanisms if insecticide resistance and monitoring”. Symposium on Insect Molecular Toxicology and Chitin Metabolism, Institute of Applied Biology, Shanxi University, China, 6/26/2011.
108. Invited National Meeting Speaker, “Assessment of the effects of 0.5% ivermectin cream on head lice ova”, 37<sup>th</sup> Annual Meeting, Soc. for Pediatric Dermatology, Baltimore, MD, 7/7/2011.
109. Invited Industry Seminar Speaker, “PBH attenuates oxidative metabolism of permethrin in insects”. Bayer Cropscience, Kansas City, MO, 12/10/2010.
110. Invited Industry Seminar Speaker. “PBH attenuates oxidative metabolism of permethrin in insects”. Syngenta, Greensboro, NC, 12/15/2010.
111. Invited Platform Speaker. “Brief exposures of human body lice to sub-lethal amounts of ivermectin over transcribes detoxification genes involved in tolerance”. Sixth International Symposium on Insect Science, Amsterdam, The Netherlands, 10/3/2011.
112. Invited Symposium Speaker. “Human lice: past, present and future control”, American Chemical Society 244<sup>th</sup> National Meeting and Exposition, Philadelphia, PA, 8/19/2012.
113. Invited Speaker. “Human lice: Extent, mechanisms and monitoring of pediculicide resistance”, Basic Science Pre-meeting Course, Phenotypic and Molecular Markers of Emerging Anti-parasitic Drug Resistance, Amer. Soc. of Tropical Med. and Hygiene, 61<sup>st</sup> Ann. Meeting, Atlanta, GA, 11/10/2012.
114. Invited Speaker, “Determining vector survival rates and population age structure: Cuticular hydrocarbon analyses. FNIH Workshop: Monitoring Mosquito Transmission of Malaria, Amer. Soc. of Tropical Med. and Hygiene, 61<sup>st</sup> Ann. Meeting, Atlanta, GA, 11/15/2012.
115. Invited Departmental Seminar Speaker. “Human lice: Simplistic lifestyle, small genome, much misery”, Department of Entomology, University of Florida, Gainesville, FL, 3/14/2013.
116. Poster Presentation. Proliferation and excretion of *Bartonella quintana* in body and head lice following oral challenge. ESA 61<sup>st</sup> Annual Meeting, Austin, TX, 11/10-13/2013.

117. Invited Symposium Speaker, “The fate of pesticides in turfgrass environments”, Pesticide Exposures on Community Sports Fields, Crop Science Soc. of America Annual Meeting, Tampa, FL, 11/5/2013.
118. Poster Presentation. Rat brain neurolemma microtransplanted into *Xenopus* oocytes is a useful tool to examine the effects of environmental toxicants on endogenous voltage-sensitive ion channels. 53<sup>rd</sup> Soc. of Toxicol. Ann. Meeting & ToxExpo, Phoenix, AZ, 3/23-27/2014.
119. Invited Industry Speaker, “Pediculicide resistance: Mechanisms, extent and management”, Challenges in the Evidence-based Management of Head Lice Infestations. Sanofi Pasteur Inc. Short Hills, NJ, 5/31/2014.
120. Invited Symposium Speaker. “Ivermectin: Chemistry, mode of action and proactive resistance management.” Recent Advances in the Control of Head Lice. 5th International Conference of Phthiraptera, Park City, Utah. 8/2/2014.
121. Invited Symposium Speaker. “Possible role of ABC transporters in insecticide resistance in human lice and *Drosophila melanogaster*.” Entomological Soc. of Amer. 61st Ann. Meeting, Austin, TX. 10/10/2013.
122. Poster Presentation. Determination of DDT resistance mechanisms and their synergism in *Drosophila melanogaster* using RNAi approaches. 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, CA. 8/10/2014.
123. Poster Presentation. Permethrin increases tetrodotoxin-sensitive sodium currents associated with rat brain tissue microtransplanted into *Xenopus laevis* oocytes. 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, CA. 8/10/2014.
124. Invited Symposium Speaker. “Pyrethroids and Malathion: Chemistry, mode of action and current resistance status.” Recent Advances in the Control of Head Lice. 5th International Conference of Phthiraptera, Park City, UT. 8/2/2014.
125. Invited Symposium Speaker. “Human lice: Simple lifestyle, small genome , much misery.” 13 IUPAC International Congress of Pesticide Chemistry, San Francisco, CA. 8/10/2014.
126. Poster Presentation. Expansion of the kdr allele frequency map from head louse populations within the USA. 5th International Conference on Phthiraptera, Park City, UT. 8/2/2014.
127. Poster Presentation. Functional expression of native ion channels expressed in rat brain tissue microtransplanted into *Xenopus laevis* oocytes and characterization of TTX-sensitive current. 13th IUPAC International Congress of Pesticide Chem., San Francisco, CA. 8/10/2014.
128. Poster Presentation. Developing a behavioral bioassay to determine ovipositional avoidance of female head lice on hair tufts treated with formulated repellents. 5th International Conference on Phthiraptera, Park City, UT. 8/2/2014.
129. Poster Presentation. Validation of voltage-sensitive sodium channel isoform expression in adult and juvenile rat brain tissue microtransplanted into *Xenopus* oocytes. 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, CA. 8/10/2014.

130. Invited Symposium Speaker. RNAi validation of resistance genes and their interactions in the highly DDT-resistant 91-R strain of *Drosophila melanogaster*. 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, CA. 8/14/2014.
131. Invited Symposium Presentation. Evaluation of an in vitro assay to characterize the effects of environmental contaminants on native ion channels in the spirit of good laboratory practices: Role of University laboratories. 146th Amer. Chem. Soc. Nat. Meeting, Indianapolis, IN. 9/8/2013.
132. Invited Symposium Speaker. “Differential gene expression in human head and body lice when challenged with *Bartonella quintana*.” Genomics of Lice and Their Microbes. 5th International Conference on Phthiraptera, Park City, UT. 8/2/2014.
133. Poster Presentation. Exposure to permethrin alters glucose metabolism in response to high-fat diet in female C57BL/6J mice. 54<sup>th</sup> Annual Meeting and ToxExpo, Soc. of Toxicol. San Diego, CA 3/24/2015.
134. Invited Platform Presentation. “ Targeted evaluation of age-related pharmacodynamics using mammalian CNS neurolemma preparations.” Roundtable Session: Addressing Potential Age-related Sensitivity to the Neurotoxicity of Pyrethroids. 54<sup>th</sup> Ann. Meet. and Tox Expo, San Diego, CA 3/23/15.
135. Invited Platform Speaker. “Making headway against head lice: The choices are changing.” American Pharmacist Association Nat. Meeting, San Diego, CA 3/28/15.
136. Invited Platform Presentation. “Pyrethroid Treatment Failures and Genetic Resistance Patterns in Head Lice in the United States.” Symposium: Educating Ourselves About Lice in the School Setting. Ann. Meet. Nat. Assoc. of School Nurses, Philadelphia, PA 6-25-15.
137. Poster Presentation. Expansion of the *kdr* Allele Frequency Map from Human Head Louse Populations within the USA through the use of Quantitative Sequencing. Ann. Meet. Nat. Assoc. of School Nurses, Philadelphia, PA 6-24-15.
138. Poster Presentation. Utilizing reduced risk pesticides and IPM strategies to mitigate golfer exposure and hazard. American Chemical Society 250th National Meeting and Exposition, Boston, MA, 8/16-20/15.
139. Poster Presentation. Exposure to permethrin alters glucose metabolism in response to high-fat diet in female C57BL/6J mice. 54<sup>th</sup> Annual Meeting and ToxExpo, Soc. of Toxicol. San Diego, CA 3/24/2015.
140. Poster Presentation. Attenuation of pesticide-laden runoff using vegetative filter strips. American Chemical Society 250th National Meeting and Exposition, Boston, MA, 8/16-20/15.
141. Poster Presentation. Microtransplantation of rat brain neurolemma into *Xenopus laevis* oocytes to study the effect of environmental toxicants on endogenous voltage-sensitive ion channels. American Chemical Society 250th National Meeting and Exposition, Boston, MA, 8/16-20/15.
142. Poster Presentation. Investigations into the role of ACBC4 in ivermectin tolerance. American Chemical Society 250th National Meeting and Exposition, Boston, MA, 8/16-20/15.

143. Invited Symposium Speaker. Pyrethroid-resistant head lice: Updated status, lessons learned and management in the 21st century. American Chemical Society 250th National Meeting and Exposition, Boston, MA, 8/16-20/15.
144. Invited Plenary Speaker. Effects of pyrethroids on rat brain neurolemma-injected oocytes: Examining potential age-related pharmacodynamic differences. II International Symposium on Pyrethrum 2015. Kyoto University, Kyoto, Japan. 8/6-9/15.
145. Symposium Speaker, Odorant receptor-based discovery of natural repellents of human lice, XXV Int. Cong. of Entomology, Orlando. FL, 9/25-30/16.
146. Invited Symposium Speaker. Use of RNAi to validate genes involved in insecticide tolerance as a proactive resistance monitoring strategy. XXV Int. Cong. of Entomology, Orlando. FL, 9/25-30/16.
147. Symposium Speaker. Does timing matter in pesticide resistance? One splice variant of MDR49 provides early but not late protection to DDT. XXV Int. Cong. of Entomology, Orlando. FL, 9/25-30/16.
148. Poster Presentation. Characterization of PhABCC4 involved in ivermectin tolerance. XXV Int. Cong. of Entomology, Orlando. FL, 9/25-30/16.
149. Invited Symposium Speaker. Investigations into the use of neurolemma-injected oocytes in determining age-related differences in the action of insecticides on native ion channels. American Chemical Society 252th National Meeting and Exposition, Philadelphia, PA, 8/21-25/16.
150. Invited Symposium Speaker. Pediculicide resistance to the OTC formulations in human head lice: Mechanisms, extent and management. Summit 2016, Lice Clinics of America, Salt Lake City, UT 11/2-4/16.
151. Poster Presentation. Differential RNAi approaches to enhanced knockdown efficiency of target gene transcripts in the highly DDT-resistant 91-R strain of *Drosophila melanogaster*. XXV Int. Cong. of Entomology, Orlando. FL, 9/25-30/16.
152. Invited Symposium Speaker. Investigations into the use of neurolemma-injected oocytes in determining age-related differences in the action of insecticides on native ion channels. American Chemical Society 252th National Meeting and Exposition, Philadelphia, PA, 8/21-25/16.
153. Poster Presentation. Pyrethroids increase tetrodotoxin-sensitive sodium currents expressed in rat brain tissue microtransplanted into *Xenopus laevis* oocytes." 56th Society of Toxicology Annual Meeting and ToxExpo, Baltimore, MD. 3/12-16/17.
154. Poster Presentation. Exposure to imidacloprid promotes obesity in female C57BL/6J mice. 56th Society of Toxicology Annual Meeting and ToxExpo, Baltimore, MD. 3/12-16/2017.
155. Poster Presentation. Permethrin regulates intracellular calcium and induces oxidative stress and ERK1/2 activation in Hepg2 cells. 56th Society of Toxicology Annual Meeting and ToxExpo, Baltimore, MD. 3/12-16/2017.
156. Poster Presentation, Pyrethroids increase tetrodotoxin-sensitive sodium currents expressed in rat brain tissue microtransplanted into *Xenopus laevis* oocytes. 23rd Annual Meeting and Short Course NAC-SETAC, Amherst, MA. 6/14-16/2017.

157. Invited Keynote Speaker, Overcoming insecticide resistance: detection and management of insecticide-resistant human lice. 2<sup>nd</sup> International Symposium on Insect Molecular Toxicology and Chitin Metabolism. Shanxi University, Taiyuan, China 6/27-30/2017.
158. Invited Plenary Speaker, Overcoming insecticide resistance: detection and management of insecticide-resistant lice. 6<sup>th</sup> International Symposium on Insect Physiology, Biochemistry and Molecular Biology, Hangzhou, China 7/1-4/2017.
159. Invited Departmental Seminar Speaker, Overcoming insecticide resistance: detection and management of insecticide-resistant lice. Department of Pesticide Toxicology, Nanjing, China, 7/6/2107.
160. Invited Symposium Speaker, Overcoming insecticide resistance: detection and management of insecticide-resistant lice. 254<sup>th</sup> ACS National Meeting and Exposition, Washington, DC, 8/20-24/2017.
161. Invited Symposium Speaker, Identification and interaction of multiple genes resulting in DDT resistance in the 91-R strain of *Drosophila melanogaster* by RNAi approaches. 254<sup>th</sup> ACS National Meeting and Exposition, Washington, DC, 8/20-24/2017.
162. Invited Departmental Seminar Speaker, Exposure of Golfers to Pesticides. Department of Agricultural Biotechnology, Seoul National University, Seoul, Republic of Korea, 10/31/2017.
163. Invited Departmental Seminar Speaker, Identification and interaction of multiple genes resulting in DDT resistance in 91-R strain of *Drosophila melanogaster* by RNAi approaches. Department of Agricultural Biotechnology, Seoul National University, Seoul, Republic of Korea, 11/1/2017.
164. Invited Plenary Speaker, using neurolemma-injected oocytes to determine age-related differences to pyrethroid sensitivity. International Symposium of the Korean Society of Pesticide Science, 20<sup>th</sup> Anniversary "Past and Future of Korean Pesticide Industry, Buan, Republic of Korea, 11/3/2017.
165. Invited Plenary Lecture. Determination of toxicodynamic differences in sodium channel isoforms to pyrethroids in juvenile and adult rat brain tissue microinjected into *Xenopus* oocytes. International Conference on Green Plant Protection Innovation, Boao, Hainan, China, 5/9-12/2018.
166. Platform Presentation. Overcoming insecticide resistance: detection and management of insecticide-resistance in human lice. International Conference on Phthiraptera 6 (ICP6), Brno, Czech Republic, 6/23-29/2018.
167. Poster Presentation. Treatment of lice: In vitro pediculicidal and ovicidal efficacy of a two component dimeticone after ultrashort application. International Conference on Phthiraptera 6 (ICP6), Brno, Czech Republic, 6/23-29/2018.
168. Poster Presentation. Determination of toxicodynamic differences of sodium channel isoforms to pyrethroids in juvenile and adult rat brain tissue microtransplanted into *Xenopus* oocytes. 256<sup>th</sup> ACS National Meeting & Exposition. Boston, MA. 8/19-23/2018.
169. Invited Platform Speaker. Determination of toxicodynamic differences of sodium channel isoforms to pyrethroids in juvenile and adult rat brain tissue microtransplanted into *Xenopus* oocytes. Pyrethrum Workshop 2018, Queen's College, Cambridge University, Cambridge, UK 9/3-5/2018.

## **EXTENSION LECTURES (23):**

1. Lecture, "How Pesticides Kill," UMASS Pesticide Program, 1/26/83.
2. Lecture (2), "The Implications of Pest Resistance to Insecticides," UMASS Pesticide Program, Waltham Exp. Station, Waltham, MA 2/7/84 and 2/9/84.
3. Lectured at the 30th Annual Meeting of the Northeastern Mosquito Control Association "Mosquito Resistance to Pesticides," Worcester, MA 10/16/84.
4. Lectured to the executive committee, Dept. of Food and Agric. State of Mass. on "A Historical Look at the Developmental Use of Insecticides," Boston, MA 3/26/85.
5. Presented a paper at the New England Fruit Meetings, Concord, NH. 1/9/86. "The Fate of Insecticides from Apple Orchards."
6. Lecture presented "Do Application Recommendations Reduce Pesticide Drift?" UMASS, IPM Program, Waltham Exp. Station, Waltham, MA. 3/15/86.
7. Lectured at the Massachusetts Turfgrass Conference and Trade Show, "Where do Pesticides Go?" 1/14/97, att: 400+, Boston, MA.
8. Lectured to the Cape Cod Cranberry Assoc. on pesticide drift due to aerial application to bogs - 1/22/87, att: 52, Sandwich, MA.
9. Moderator of a discussion panel "Managing the risks of pesticides: What Role Monitoring?" Org. by New Eng. Interstate Water Pollution Cont. Comm. UMass-Amherst, 11/4/87, Att: 150.
10. Presented an informal lecture on the merits and problems associated with adult mosquito control by pesticides, Northampton Town Meeting, 6/29/88, Att. 100, Org. by Northampton Mosq. Control Task Force.
11. Final data presentation of apple and cranberry pesticide drift projects (MPAL) to the Mass. Pesticide Board, UMass-Amherst, MA. 8/3/88. Att. 40.
12. Presented Research Results "Turfgrass toxicity & chemistry" to the participants (@ 200) of the 1996 Turfgrass Field Day, 6/5/96, S. Deerfield, MA.
13. Presented Annual Report, "Human exposure to turfgrass pesticides", Annual Meeting, NE 181, Amherst, MA 11/15-17/95.
14. Presented Annual Report, "Biochemistry and molecular biology of azinphosmethyl resistance in Colorado potato beetle." Annual Meeting, NE 180, New Orleans, LA, 3/17/96.
15. Invited Lecture. "UMASS Turfgrass Field Day, 6/18/97. S. Deerfield, MA. "Turfgrass pesticides: Toxicity and chemistry."

16. Invited Lecture. Annual Meeting, NE 181, Ithaca, NY, 9/26-27/96. "Human exposure to turfgrass pesticides."
17. Invited Lecture. New Jersey Annual Vegetable Meeting, 1/19-21/99. Atlantic City, NJ. "Movement of pesticides to groundwater: Fact & fiction."
18. Invited Lecture. 3<sup>rd</sup> Annual New England Regional Turfgrass Conference and Show, 3/7-9/01, Providence, RI. "Reduced golfer exposure to turfgrass pesticides by managed post-application irrigation practices."
19. Invited Lecture. 2001: A Turfgrass Odyssey, New York State Turfgrass Association Exposition, 11/13-15/01, Syracuse, NY. "Understanding and Minimizing Exposure to Turf Pesticides."
20. Invited Lecture. 2005. Best Management Practices to Minimize Exposure to Turfgrass Pesticides. 28<sup>th</sup> Annual Maryland Turfgrass Conference and Trade Show, Baltimore, MD. 1-19-05.
21. Invited Lecture. 2007. Golfer Exposure to Pesticide Treated Turf. 2007 Canadian International Turfgrass Conference & Trade Show. Montreal, Quebec. 3-5-07.
22. Invited Lecture. 2008. Minimizing Golfer Exposure to Turfgrass Pesticides. NEGCSA Symposium, Saratoga, NY. 1-9-08.
23. Invited Lecture. 2008. Minimizing Golfer Exposure to Turfgrass Pesticides. Wisconsin Turfgrass & Greenscape EXPO, Madison, WI. 1-10-08.

### **SYMPOSIA ORGANIZATION (24) AND PARTICIPATION (9):**

1. Participant, Satellite symposium, "The Mode of Action of Pesticides" sponsored by Sumitomo Chemical Co., Ltd., Osaka, Japan. 8/30/82.
2. Participant, Society of Toxicology National Meeting in Boston, MA., 2/22/82- 2/26/82.
3. Symposium Co-organizer, a XVII International Congress of Entomology in Hamburg, 8/21/84. "Membrane Receptors and Enzymes as Sites of Insecticidal Action."
4. Participant, 1986 UCLA Symposium on "Molecular Entomology," Steamboat Springs, CO. 3/01/86-4/5/86.
5. Invited Participant, Gordon Research Conference, "Environmental Science: Water," New Hampton School, New Hampton, NH. 6/16/86-6/10/86.
6. Participant, 40th Annual Meeting of The Society of General Physiology, "Cell Calcium and the Control of Membrane Transport," Marine Biological Laboratory, Woods Hole, MA, 9/3/86-9/7/86.
7. Participant, 27th National Society of Toxicology Meeting, Dallas, TX, 2/15-19/88.

8. Symposium Organizer, "The Role of Biotechnology in Biorational Approaches to Pest Management," 61st ESA-Eastern Branch Meeting, Providence, R.I., Oct. 1-4, 1989.
9. Member, ESA-Eastern Branch Program Committee, 1989, 61st Annual Meeting, Providence, RI (10/1-4/89).
10. Participant, Phosphorylation/Dephosphorylation in Signal Transduction. Orgs. O.H. Barbacid and J.B. Bolen, Keystone Symposium on Molecular and Cellular Biology, Keystone, Co. 1/17-24/93.
11. Symposium Organizer, "Molecular Action and Pharmacology of Insecticides on Ion Channels," 207th ACS Natl. Meeting, San Diego, CA. 3/13-18/94.
12. Symposium Organizer, "Fate of Turfgrass Chemicals and Pest Management Approaches, 210<sup>th</sup> ACS Natl. Meeting, Boston, MA. 8/98.
13. Symposium Organizer, "Mechanisms of Resistance and Management Strategies." 70<sup>th</sup> ESA, Eastern Branch Meeting, Virginia Beach, 2/21-24/99.
14. Topic Co-Organizer, Topic B "Pesticide Resistance", 2<sup>nd</sup> Pan Pacific Pesticide Conference, Honolulu, HI. 10/25-28/99.
15. Symposium Organizer, "Benefits and Challenges in Understanding Insecticide Mechanism of Action", Amer. Chem. Society/AGRO Division International Award for Research in Agrochemicals - Robert M. Hollingworth, 225<sup>th</sup> ACS National Meeting, New Orleans, LA, 3-24-03.
16. Session Co-Organizer, "Control Agents for Vectors of Communicable Diseases", 3<sup>rd</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 6/1-4/03.
17. Symposium Co-Organizer, "Agrochemical Issues in Urban Environments", Amer. Chem. Society/AGRO Division International Award for Research in Agrochemicals – Isamu Yamaguchi, 227<sup>th</sup> ACS Natl. Meeting, Anaheim, CA.. 3/29-30/04.
18. Symposium Organizer, "Fungicides" 232<sup>nd</sup> ACS Natl. Meeting, San Francisco, CA. 9/11/06.
19. Symposium Co-Organizer, Amer. Chem. Society/AGRO Division International Award for Research in Agrochemicals – F.J. Perlak, 234<sup>th</sup> ACS Natl. Meeting, Boston, MA. 8-21-07.
20. Session Co-organizer, "Control Agents for Vectors of Communicable Diseases", 4<sup>th</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 6/1-4/08.
21. Session Co-organizer, "Resistance to Pesticides", 4<sup>th</sup> Pan-Pacific Conference on Pesticide Science, Honolulu, HI, 6/1-4/08.
22. Session Co-organizer, "Resistance Mangement: Insect disease vectors." 12<sup>th</sup> IUPAC International Congress of Pesticide Chemistry, Melbourne, Australia, July 2010.
23. Invited Participant. "Shifting Paradigm of Drug Resistance", Institute for Drug Resistance, University of Massachusetts Medical School, Worcester, MA 10/6/09.



24. Symposium Co-organizer, “Mechanisms of Insecticidal Action and Resistance: New Compounds and Recent Advances”, American Chemical Society 244<sup>th</sup> National Meeting and Exposition, Philadelphia, PA, 8/22/2012.
25. Symposium Co-organizer, “Fate and Exposure of Urban Applied Pesticides in the Context of Human and Ecological Risk Assessment”, American Chemical Society 244<sup>th</sup> National Meeting and Exposition, Philadelphia, PA, 8/23/2012.
26. Symposium Co-organizer, “Recent Advances in the Control of Head Lice”, 5<sup>th</sup> International Conference on Phthiraptera, Park City, UT, 8/2-7/2014.
27. Symposium Co-organizer, “Insecticide Mode of Action and Resistance”, 13<sup>th</sup> IUPAC International Congress of Pesticide Chemistry, San Francisco, CA, 8/10-14/2014.
28. Symposium Co-organizer, “”Fifty Years of Research and Mentoring: Symposium in Honor of Dr. Fumio Matsumura”, 13<sup>th</sup> IUPAC International Congress of Pesticide Chemistry, San Francisco, CA, 8/10-14/2014.
29. Symposium Co-organizer: “Urban Agriculture: Turf, Ornamental, Household Products and Water-Re-use”. ACS AGRO Division, 250<sup>th</sup> National meeting and Exposition, Boston, MA August 16-20, 2015.
30. Participant, “Metabolic Syndrome and Associate Diseases: From the Bench to the Clinics.” SOT 56<sup>th</sup> Annual Meeting, Baltimore, MD, 3/11/2017.
31. Symposium Co-organizer: “Biorational Control of Medical and Veterinary Pests”. 254<sup>th</sup> National Meeting & Exposition of the American Chemical Society, Washington, DC, August 20-24, 2017.
32. Symposium Organizer: “Advances in Insecticide Mode Action, Chemistry and Resistance: AGRO International Award Symposium for Dr. J.R. Bloomquist”. 254<sup>th</sup> National Meeting & Exposition of the American Chemical Society, Washington, DC, August 20-24, 2017.
33. Symposium Co-Organizer: “INsecticide TARgets (INSTAR) Summit”, 256<sup>th</sup> National Meeting & Exposition of the American Chemical Society, Boston, MA, August 19-23, 2018.

**GRANTS AND CONTRACTS RECEIVED (111): \$18,593,504 (9-19-2018)**

- FEDERAL (38): NIH (11), USDA (24), NSF (1). USGA (1) EPA (1)
  - STATE (6)
  - INDUSTRY (51)
  - PRIVATE (16)
1. NIH-Biomedical Research Support Grant (NIH-RR07048-16) “Action of DDT and Pyrethroid Insecticides on Ca<sup>2+</sup> Regulation in Subcellular Fractions of the Nervous and Muscle Systems of the American Cockroach, *Periplaneta americana*.” J. Marshall Clark, Principal Investigator. Direct Cost \$5,000. 11/2/81-11/1/82.

2. USDA (Hatch MAES529), "ATPase Inhibition and Electrophysiological Changes Caused by DDT and Related Neuroactive Agents in Cockroach Nerve and Muscle." J. Marshall Clark, Principal Investigator. Direct Cost \$125,000. 12/14/81-12/13/86.
3. USDA (Competitive Research Grants Program), "Estimating Density of Gypsy Moths by Pheromone Traps." J. S. Ellington, R. T. Cardé, J. M. Clark, Co-Principal Investigators. Annual direct costs \$49,000. 8/1/82-7/31/84.
4. USDA/NE PIAP-Agric. Exp. Station (USDA SEA 79-CRSR-2-0338) "Selective Toxicity of Insecticides to Parasites of the Apple Blotch Leafminer." J. Marshall Clark, Principal Investigator. Annual direct costs \$5,257. 10/1/82-9/30/83.
5. USDA/NE PIAP. Penn. State University/Northeast Pesticide Impact Assessment Program (USDA TPSU UM 2057-259) "Suppression of the Development of Resistance in Colorado Potato Beetle by Sequential Application of Insecticides." J. Marshall Clark, Principal Investigator. Annual direct costs. \$15,300. 6/1/83-11/30/84.
6. NIH (RR07048-19) Biomedical Research Support Grant. "Modification of Adrenergic Neurotransmitter Release by Subacute Exposure to Pesticides." John Marshall Clark, Principal Investigator. Direct cost \$4,630. 4/1/84-3/31/85.
7. NIH/ESA Travel Grant for the XVII International Congress of Entomology, Hamburg, 8/20-8/26/84. \$500.00. 6/13/84.
8. Faculty Research Grant for Conference/Performance Travel for the XVII International Congress of Entomology, Hamburg, 8/20-8/26/84. \$500.00. 7/5/84.
9. Massachusetts Fruit Growers' Association, Inc. "Effect of Alkaline pH due to Technical Calcium Chloride Addition on the Degradation Rates of Pesticides in Aqueous Formulations." J. Marshall Clark, Principal Investigator, Direct costs \$2,000. 7/18/83.
10. USDA/NE PIAP. Penn. State University/Northeast Pesticide Impact Assessment Program (USDA TPSU UM 2057-259), "Genetics of Resistance in Colorado Potato Beetle to Azinphosmethyl, Permethrin and Avermectin." J. Marshall Clark, Principal Investigator. Direct annual costs \$22,000. 4/1/85-3/31/87.
11. Massachusetts Pesticide Bureau, Department of Food and Agriculture, "Fate of Insecticides in Aerosol Sprays applied to Massachusetts Apple Orchards." J. Marshall Clark, Principal Investigator, Annual direct costs \$5,500. 5/1/85.
12. The Commonwealth of Massachusetts Reclamation Board. "Generic Environmental Impact Report on Mosquito Control." J.D. Edman-P.I., J. M. Clark-Co P.I. Annual direct costs \$86,761. 7/1/85-6/30/87.
13. USDA/NE PIAP. Penn. State University/Northeast Pesticide Impact Assessment Program (USDA TPSU UM 2057-259), "Genetics of Resistance in CPB: Field Applications." J. Marshall Clark, Principal Investigator. Direct annual costs \$23,000. 4/1/86-3/31/87.

14. Department of Food and Agriculture, Massachusetts Pesticide Bureau, "Comparison of Chemical Trespass due to Aerial and Sprinkler Application of Ethyl Parathion to a Cranberry Bog," In conjunction with the Massachusetts Cranberry Assoc., Ocean Spray, Inc. and DeCran, Inc. J. Marshall Clark, Principal Investigator. Direct annual costs \$14,000. 6/1/86.
15. Cape Cod Cranberry Grower's Association. "Comparison of Chemical Trespass due to Aerial and Sprinkler Application of Parathion to a Cranberry Bog." J. Marshall Clark, Principal Investigator. \$4,000. Unrestricted.
16. USDA (Hatch MAES), "Investigations into the Effect of Insecticides on Protein Phosphorylation Events in Nerve." J. Marshall Clark, Principal Investigation. Direct costs \$115,000. 10/1/86-9/30/91.
17. Dept. of Environmental Quality Engineering-Project No. M87-01, "An Examination of Sediments for Levels of Selected Herbicide/Pesticide Residues." J. Marshall Clark, Principal Investigator. Total Direct Costs \$8,984.60. 7/15/87-6/14/88.
18. USDA (NE Regional Pesticide Impact Program-NAPIAP). "Migration of Pesticides Residues in Soil." J. Marshall Clark, Co-PI with P.L.M. Veneman. Total Direct Costs \$25,000. 4/2/87-2/28/88.
19. USDA (NE Regional Pesticide Impact Assessment Program-NAPIAP). "Genetics of Resistance in CPB: Biochemical Mechanisms." J. Marshall Clark, Principal Investigator. Total Direct Costs \$44,000. 6/1/87-5/31/89.
20. Monsanto Agrochem. Co. "Alachlor, Atrazine and Metalachlor Monitoring of Soil and Groundwater in Two Massachusetts Cornfields (MPAL/DFA)," \$60,165, funded 4/1/88. Co-PI with J. Jenkins, P.I.
21. Monsanto Agrochem. Co., "Massachusetts 1988 Well Water Survey (MPAL/DFA)." \$5,000.00, funded 4/1/88, Co-PI with J. Jenkins, P.I.
22. USDA (NE Regional Pesticide Impact Program-NAPIAP). "Effect of Edaphic Conditions on Pesticide Migration in Soils." J. Marshal Clark, Co-PI with T.L. Potter. Total Direct Costs \$40,000. 9/1/89-8/31/91.
23. USDA (NE Regional Pesticide Impact Program-NAPIAP). "Genetics, Biochemistry and Molecular Biology of Abamectin Resistance in Colorado Potato Beetle." Total Direct Costs \$39,100, 9/1/89-8/31/91.
24. Town of Yarmouth, "Well Water Monitor of Bayberry Golf Course." J. Marshall Clark, P.I. Total Direct Costs \$102,735. 11/1/88-present (FY01 \$3500).
25. Monsanto Agrochem. Co., "Alachlor, Atrazine and Metalachlor Monitoring of Soil and Groundwater in Two Massachusetts Cornfields," (MPAL/DFA), \$30,000, 6/1/89.
26. USDA (NE-NAPIAP). "Molecular Approaches to Managing Abamectin Resistance." J.M. Clark-PI. Total Direct Costs \$46,000, 9/1/91-8/31/93.

27. United States Golf Association (USGA). "Mass Balance Assessment of Pesticides and Nutrients to Golf Turf." J.M. Clark (Co-PI, with R.J. Cooper). Total Direct Costs \$120,980. 2/1/91-1/31/94.
28. USDA (NE-NAPIAP). "Environmental Toxicification of Alachlor." J.M. Clark, Co-PI (with T.L. Potter and C.M. Yin). Total Direct Costs \$50,000. 5/1/91-4/31/93.
29. Merck & Co. Inc.. "Abamectin Resistance in Insects." J.M. Clark, PI. Total Direct Costs \$5,000 10/14/90-indefinite.
30. Dow Elanco, DuPont, Ciba Geigy, Mobay, Golf Course Superintendents Assoc. of New England. "Fungicide Control of Summer Patch with Minimal Environmental Impact." J.M. Clark, Co-PI (with G. Schumann and B. Clarke). Total Direct Costs \$13,917. 1/1/91-12/31/91.
31. USDA (Hatch/MAES). "Biochemistry and Molecular Mechanisms of Insecticide Resistance in Colorado Potato Beetle." J.M. Clark. Total Costs \$90,000, 10/1/91-9/30/96.
32. USDA (NE-NAPIAP). "Minimizing Pesticide Residues on Cranberry Fruit by Ground, Aerial and Chemigation Applications." J.M. Clark Co-PI with A. Averill. Total Direct Costs \$40,200. 5/1/93-9/30/95.
33. NSF/ILI-"Est. of an Analytical Lab. Course for Environ. Sci. Undergraduates". Co-PI with R. Levin and R. Walker. Total Direct Costs \$55,093. 9/1/93-8/31/96.
34. USGS/WRRC. "Development of Immunological Detection Methods for the Mutagenic Metabolites of the Carcinogenic Herbicide, Alachlor, in Ground and Surface Waters." J.M. Clark. PI. Total Direct Costs \$138,406. 7/1/94 - 6/30/96.
35. Town of Barnstable, MA. "Groundwater Monitoring Plan - Olde Barnstable Fairgrounds Golf Course." J.M. Clark, PI. Total Direct Costs since 1994 \$78,625 (FY01, \$5,000).
36. USDA/NRI (USDA 94-37102-10-11). "Immunological Detection of Mutagenic Metabolites of Alachlor in Groundwater and Blood." J.M. Clark, PI. Total Direct Costs \$46,500. 6/1/94 - 5/31/96.
37. USGA (Green Section) - "Development of Pest Management Systems for Screening Turfgrass Pesticides for Potential Volatility and Dislodgeable Foliar Residues and Evaluation of Management Factors Affecting Volatile Loss and Dislodgeable Foliar Residues". J.M. Clark (Co-PI with R.J. Cooper). Total Direct Costs \$171,877. 2/1/95-1/31/99.
38. USDA/NRI (USDA 95-37302-1887). "Molecular Analysis of Altered Acetylcholinesterase from Colorado Potato Beetle: A Model for Development of DNA Diagnostics and Organophosphate/Carbamate Resistance Management." J.M. Clark, P.I. Total Direct Costs \$111,441.66. 8/1/95-7/31/98.
39. USDA (NE Regional Res. Project 187, MAES). "Reduction of Volatile and Foliar Dislodgeable Residues following Application of Turfgrass Pesticides." J.M. Clark, PI. Total Costs \$72,000. 10/1/96-9/30/00.

40. Massachusetts Turf and Lawngrass Association. "Recreational Exposure of Golfers to Turfgrass Pesticides applied to Golf courses: Assessment of Volatile and Dislodgeable Foliar Residues." J.M. Clark, P.I. Total Direct Costs \$46,290. 9/1/98-8/31/00.
41. National Pediculosis Association. "Insecticide Resistance in the Head Louse." J.M. Clark & J.D. Edman, Co-PIs. Total Direct Costs \$11,763. 2/15-8/31/99.
42. NIH/NIAID-(PHS 1 R01 AI22119-11),"Multiple Blood Feeding by Mosquitoes." T.W. Scott & J. D. Edman, Co-PIs, Total Direct Costs \$1,298,238. Co-I, J.M. Clark, 8/1/99-7/31/04.
43. USGA (Green Section). "Recreational Exposure of Golfers to Turfgrass Pesticides applied to Golf Courses: Direct Human Exposure." J.M. Clark, Co-PI. Total Direct Costs \$100,000. 2/1/00 – 1/31/04.
44. National Pediculosis Association. "Large-scale Rearing of Head Lice." J.M. Clark, PI. Total Direct Costs \$8000. 3/1/00-8/31/00.
45. Merck Research Laboratories. Work-for-Hire Project: "Permethrin Resistance in Head Lice." J.M. Clark, PI. Total Direct Costs \$4520. 4/21/00- unrestricted.
46. NIH/NIAID (PHS 1 RO1 AI45062-01A1) "Detection of Insecticide Resistance in the Head Louse *Pediulus humanus capitis* and management of Pediculosis." J.M. Clark, P.I. Total Direct Costs \$460,500. 9/15/00-9/14/03.
47. Pyrethroid Working Group-PWG (AgrEvo, Bayer, DuPont, FMC, Novartis, Valent, Zeneca)- Industry-supported Research Project: Evaluation of the Action of Pyrethroids on Voltage-Sensitive Calcium Channel Types." J.M. Clark, PI. Total Direct Costs \$156,000. 7/16/00-7/15/03.
48. New England Regional Turf Foundation (NERTF)- "Reduced Golfer Exposure to Pesticides." J.M. Clark, PI. Total Direct Costs \$52,000. 5/1/00-4/30/04.
49. Syngenta Corp.- Industry-supported Research Project: "Action of Isomers of lambda-cyhalothrin on Voltage-sensitive Calcium Channels from Rat Brain Synaptosomes". J. M. Clark, PI, Total Direct Costs \$96,100. 7/1/03-6/30/04.
50. USDA/ NE Regional Res. Project R587. "Reduction of Pesticide Exposure Situations on Turfgrass." J.M. Clark, PI. Total Costs \$75,000, 10/1/00-9/30/05.
51. Medicis Pharmaceutical Corp.- Work-for-Hire Project: "Effect of OVIDE and OVIDE Vehicle Effectiveness versus NIX." J.M. Clark, PI. Total Direct Costs \$29,165. 2/1/01-1/31/02.
52. USEPA/Sea Grant Program- "Developmental Effects of Contaminants on Salinity Preference and Seawater Survival of Atlantic Salmon: Integrating Physiology and Behavior." Clark, J.M. Co-I with S.D. McCormick, D.T. Lerner, E. Monsson, TC \$60,000, 3/1/01-2/28/04.
53. Pyrethroid Working Group-PWG (AgrEvo, Bayer, DuPont, FMC, Novartis, Valent, Zeneca)- Industry-supported Research Project: "Action of Pyrethroids on Voltage-Sensitive Calcium Channels from Rat Brain: Effect of Pyrethroid Mixtures on Calcium Influx and Neurotransmitter

- Release using Isolated Presynaptic Nerve Terminals." J.M. Clark, PI. Total Costs \$64,500. 3/1/03-12/31/04.
54. USDA/CSREES/Northeastern IPM Partnership Program – “Measurement of worker/scout exposure to Pesticides in “Standard” and “Reduced Risk” IPM Systems for New England Apples.” J.M. Clark, Co-PI. Total Direct Costs \$50,000.
  55. USGA (Green Section). “Managing Pesticide Exposure from Treated Turf”. J.M. Clark, PI. Total Direct Costs \$75,000. 2/1/04 – 1/31/07.
  56. New England Regional Turf Foundation (NERTF)- "Managing Pesticide Exposure from Treated Turf." J.M. Clark, PI. Total Direct Costs \$54,000. 5/1/04-4/30/07.
  57. Pyrethroid Working Group-PWG (Bayer, DuPont, FMC, Syngenta, Valent) Industry-supported research Project: “Comparative Assessment of Pyrethroids on Voltage-sensitive Sodium and Calcium Channels from Rat Brain" J.M. Clark, PI. Total Costs \$83,880. 1/1/05-12/31/05.
  58. NIH/NHGRI. “Sequencing the Human Body Louse Genome.” J.M. Clark Co-PI. Estimated Total Costs: \$750,000. 1-1-05 to 12-31-07.
  59. NIH/NIAID (R01 AI045062-04A3). “Head Louse Resistance and Control of Pediculosis”. J.M. Clark, PI. Total Costs: \$549,113. 7-1-06 to 6-30-10.
  60. USGA/Green Section. “Optimization of Vegetative Filter Strips for Mitigation of Runoff from Golf Course Turf Sites.” J.M. Clark, PI. Total Costs: \$40,000. 5/1/06-12/31/07.
  61. USGA/Green Section. “Managing Reduced Risk Pesticides Exposure from Treated Turf .” J.M. Clark, PI. Total Costs: \$90,000. 2/1/07-3/30/10.
  62. New England Regional Turf Foundation (NERTF)- "Managing Reduce Risk Pesticide Exposure from Treated Turf." J.M. Clark, PI. Total Direct Costs \$54,000. 5/1/07-4/30/10.
  63. Topaz Pharmaceuticals, LLC. Work-for-Hire Project: “Mortality Response of the Human Head Louse, *Pediculus humanus capitis*, to Ivermectin Formulation using the Hair Tuft Bioassay.” J.M. Clark, PI. Total Direct Costs \$4500. unrestricted.
  64. Topaz Pharmaceuticals, LLC. Work-for-Hire Project: “Ovicidal Action of Ivermectin Formulation on the Human Head Louse, *Pediculus humanus capitis*.” J.M. Clark, PI. Total Direct Costs \$17,000. unrestricted.
  65. Topaz Pharmaceuticals, LLC. Work-for-Hire Project: “Blood-feeding Behavior of Human Head Louse 1<sup>st</sup> Instars that Hatched from Eggs Treated with Ivermectin using the Semi-clinical Hair Tuft Bioassay” J.M. Clark, PI. Total Direct Costs \$59,433. unrestricted.
  66. Taro Pharmaceutical. Work-for-Hire Project: “Transmission of MRSA, HCV, and HBV by Human Head Lice.” J.M. Clark, PI. Total Direct Costs \$27,000. unrestricted.

67. BTG International Inc. Work-for-Hire Project: “Determine Mortality of Citronyllyl Acetate Neat and in Formulation against Permethrin-resistant Head Lice.” J.M. Clark, PI. Total Direct Costs \$40,780.
68. USGA/Green Section. “Optimization of Vegetative Filter Strips for Mitigation of Runoff from Golf Course Turf .” J.M. Clark, PI. Total Costs: \$104,400. 2/01/08 -1/31/11.
69. Massachusetts Dept. of Agriculture, ISA (SC AER UMA 910347) "Pesticide Analytical Services-Massachusetts Pesticide Analytical Laboratory (MPAL).” J. Marshall Clark, Director of Laboratory, Total Direct Costs \$5,995,480 from 10/1/84 to present (FY19 \$219,200).
70. G. Pohl Boskamp GmbH & Co. KG. Work-for-Hire Project: “Ovicidal Action of NYDA.” J.M. Clark, PI. Total Direct Costs: \$21,336.00, 6/15/09-1/31/10.
71. Unigroup ApS, Work-for-Hire Project: “Test Danish Pediculicides against NIX.” J.M. Clark, PI, Total Direct Costs: \$3000, unrestricted.
72. Vestergaard Frandsen SA, Work-for-Hire Project: “Mortality Response of the Common Bed Bug (*Cimex lectularius* L. ) to Three Treated Nets (Nets A, B, and C) using a Contact Bioassay.” J.M. Clark, PI. Total Costs: \$37,158.00. 6/1/09 to 12/31/09.
73. Lilly-Elanco Animal Health, Work-for-Hire Project: “Mortality Response of the Human Head Louse to Two Formulations using the in vitro Hair Tuft Bioassay”, J.M. Clark, P.I., Total Costs: \$36,058. 8/28/09 to 2/28/2010.
74. Topaz Pharmaceuticals, Inc. Industry-supported Research Project: “*In vitro* Functional Analysis of ABC Transporters (ABCT) Genes that Result in Tolerance to Ivermectin”. J.M Clark, P.I. Total Costs: \$122,548. 1/1/2010 to 12/31/2011.
75. NitricBio Inc., Work-for-Hire Project: “Mortality of Human Head Louse Females and Eggs treated with Nitric Oxide Gas”, J.M. Clark, PI, Total Costs: \$9000. 6/1/09 to 12/31/09.
76. NIH/NIAID (1 R56AI081933-01A2). “Functional and Transcriptional Profiling of Lice Defenses against Pediculicides”. J.M. Clark, PI. Total Costs: \$394,500. 9-1-10 to 8-31-11.
77. CAPHRA. Industry-supported Research Project: “Comparative Assessment of Pyrethroids on Native Voltage-sensitive Sodium Channels in Rat Brain.” J.M. Clark, PI. Total Costs: \$1,317,266. 8/31/2011 to 12/31/2017.
78. G. Pohl-Boskamp GmbH & Co. KG. Work-for-Hire Project: Determine hatchability and survivorship of human head lice following egg treatments with NYDA USA and Linicin Lotion 15 min at increasing exposure times. J.M. Clark, P.I., Total Costs: \$33,894.00. 1/1/2012 to 8/1/2012.
79. USDA-MAAES Hatch Grant, MAS00426, Evaluation of turfgrasses in vegetative filter strips to attenuate pesticide runoff and leaching, J.M. Clark, PI, Total Costs: \$32,000.00, 10/1/2012 to 9/30/2016.
80. Zerran International Corporation, Work-for-Hire Project: Nymphicidal and ovicidal responses of the permethrin-resistant human head louse SF-HL strain to two treatment solutions and distilled

- deionized water using the hair tuft bioassay. J.M. Clark, P.I., Total Costs: \$6,300.00. 10/26/2012 to 12/26/2012.
81. Oystershell NV, Work-for-Hire Project: Determination of the oviposition repellency and fecundity of head lice on the hair tufts treated with X92001326, X92001327, and X92001328 using a choice bioassay. J.M. Clark, P.I., Total Costs: \$17,039.00 1/30/2013 to 10-1-2013.
  82. Sanofi Pasteur Inc. Work-for-Hire Project: Expansion of their kdr allele frequency map from human head louse populations within the USA. J.M. Clark, P.I., Total Costs: \$164,969.00 7/1/2013 to 8/31/2014.
  83. Hatchtech Pty Ltd. Work-for Hire Project: Ovicidal activity of DeOvo<sup>tm</sup> Formulation. J.M. Clark, P.I., Total Costs: \$26,122.09. 12/20/2012 to 6/1/2013.
  84. Eurofins Agroservices Inc. Work-for-Hire Project: Knockdown and mortality responses of the permethrin-resistant adult head lice (SF-HL) to a pediculicidal formulation (VBC3, 10-fold dilution) using a spray-contact bioassay. J.M. Clark, P.I., Total Costs: \$7,560.00. 5/31/13 to 7/31/2013.
  85. NIH/NIEHS (1R21ES023676-01). “Role of Permethrin in Development of Obesity and Type 2 Diabetes”. J.M. Clark, Co-PI. \$234,686.00 11/1/2013-10/31/2015.
  86. NIH/NIEHS (1R21ES023676-01). “Role of imidacloprid in Development of Obesity and Type 2 Diabetes”. J.M. Clark, Co-PI. \$415,361.00. 9/10/2014-8/31/2016.
  87. Hatchtech Pty Ltd. Work-for Hire Project: Ovicidal Activity Efficacy of Four Formulated Products (Vamousse, Ovide, Natroba, and Licener)/Work-for-Hire. J.M. Clark, P.I., Total Costs: \$18,661.60. 7/1/15 to 9/30/15.
  88. G. Pohl-Boskamp GmbH & Co. KG. Work-for-Hire Project: Comparator Study-Ovicidal of Formulated Products J.M. Clark, P.I., Total Costs: \$41,491.85. 9/22/2015 to 1/31/2016.
  89. G. Pohl-Boskamp GmbH & Co. KG. Work-for-Hire Project: Formulation Study I-Ovicidal Efficacy of Formulated Products. J.M. Clark, P.I., Total Costs: \$39,778.20. 4/26/2016 to 10/31/2016.
  90. Prestige Brands Inc, Tarrytown, NY. Work-for-Hire Project: Determination of kdr Allele Frequencies from 20 Human Head Louse Samples. J.M. Clark, P.I., Total Costs: \$19,140.56. 8/15/16 to 11/1/16.
  91. NIFA/AFRI/USDA (2016-67017-24458). In situ and Real Time Monitoring and Characterization of Pesticide Residues on and in Fresh Produce using SERS. L. He (FoodSci), P.I.; J.M. Clark (VASCI), Co-P.I. Total Costs: \$473,628.00. 11/1/2015 to 9/30/2018.
  92. NIFA/USDA (2017-67021-26605). Potential toxicity of edible lipid nanoparticles: enhances pesticide uptake by food nanoemulsions. J. McClements (FoodSci), P.I.; J.M. (VASCI), Co-PI. Total Costs: \$444,550. 5/1/2017-4/30/2021.
  93. NIH/NIEHS (1R01 ES028201-01). “Toxicant disruption of receptor-mediated endocytosis in oogenesis and later life metabolic dysfunction”. A. Timme-Laragy (Public Health), P.I.; J.M. Clark (VASCI), Co-PI. Total Costs: \$1,929,114. 9/1/2017-8/31/2022.



94. Piedmont Pharmaceuticals, Greensboro, NC. Work-for-Hire Project: Determination of *kdr* allele frequencies from 24 human head louse samples. J.M. Clark, P.I. Total Costs: \$10,569. 3/15/17-4/3/17.
95. EctoGuard LLC, Noblesville, IN. Work-for-Hire Project: Formulation Study I & II; Adulticidal, larvicidal and ovicidal efficacy of formulated products. J.M. Clark, P.I. Total Costs: \$14,500. 1/3/17-6/15-17.
96. EctoGuard LLC, Noblesville, IN. Work-for-Hire Project: Formulation Study III; Adulticidal, larvicidal and ovicidal efficacy of formulated products. J.M. Clark, P.I. Total Costs: \$5,295.00. 4/17/18 - 6/11/18.
97. EcoRaider/Reneotech, Inc. Ovicidal and Adulticidal Efficacy of a Formulated Product (EcoRaider) and Two Dilutions versus a Negative Water Control: Studies 1 & 2. J.M. Clark, P.I, Total Costs: \$3,635.18. 2/12/17- 2/15/18.
98. United Laboratories, Inc., Mandaluyong, Phillippines. Ovicidal Efficacies of Formulated Products. J.M. Clark, P.I. Total Costs \$10,056.00, 1/9/18-5/15/18.
99. Lice Solutions Resources Network/Tec Laboratory, West Palm Beach, FL. Determine the Kdr Allele Frequency from 40 Human Head Louse Samples. J.M. Clark, P.I., \$13,145.69. 2/8/18-6/18/18.
100. Lice Solutions Resources Network/Homedics, West Palm Beach, FL. Determine the Kdr Allele Frequency from 5 Human Head Louse Samples. J.M. Clark, P.I., \$2,302.00. 2/8/18-6/18/18.
101. Larada Sciences, Inc., Murray, UT. Ovicidal Efficacy of Larada Sciences' Home-Use , Heated-Air Lice Treatment System (Home Device). \$3,279.78, 3/8/18-6/5/18.
102. Insight Pharmaceuticals LLC/Prestige Brands, Tarrytown, NY. Determination of the Kdr Frequencies from 6 human head louse samples. J.M. Clark, P.I., \$6,915.00. 3/23/18-6/8/18.
103. Oystershell NV, Merelbeke, Belgium, Ovicidal, Nymphicidal and Adulticidal Efficacies of Formulated Products. J.M. Clark, P.I., \$8845.00. 4/26/18-7/16/18.
104. Oystershell NV, Merelbeke, Belgium, Ovicidal and Adulticidal Efficacies of Three Formulated Test Products. J.M. Clark, P.I., \$14,629.00. 7/26/2018-9/1/18.
105. Perrigo UK Finco Limited Partnership, Allegan, MI. A 3-Arm Pilot Study to compare Slice 0.5% lotion to Perrigo Placebo/Vehicle and Distilled Deionized Water on First Instar Head Lice using a Hair Tuft Ex Vivo Bioassay. J.M. Clark, P.I. \$6369.00. 7/16/18- 10/1/18.
106. London School of Hygiene & Tropical Medicine, Arthropod Control Product Testing Centre, London, UK. Nymphicidal and Adulticidal Efficacy of a Formulated Product versus a Negative Control. J.M. Clark, P.I., \$5,593.00. 9/19/17-10/30/17.
107. London School of Hygiene & Tropical Medicine, Arthropod Control Product Testing Centre, London, UK. Ovicidal Efficacy of a Formulated Product (Shampoo) versus a Negative Control (Project 1). J.M. Clark, P.I., \$2,368.88 . J.M. Clark, P.I., \$5,593.00. 9/19/17-10/30/17.
108. London School of Hygiene & Tropical Medicine, Arthropod Control Product Testing Centre, London, UK. Ovicidal Efficacy of a Formulated Product (Diatomaceous Erath Powder Formulation) versus a Negative Control (untreated) (Project 2). J.M. Clark, P.I., \$4,217.70. 6/4/18-7/24/18.

109. London School of Hygiene & Tropical Medicine, Arthropod Control Product Testing Centre, London, UK. Ovicidal Efficacy of a Formulated Shampoo Product (Arctec), a Formulated Lotion Product (Arctec) and a Formulated Spray Product (Arctec) versus a Positive Dimeticone-based Control and a Negative Water Control (Project 3) J.M. Clark, P.I., \$5,185.50. 7/9/18-9/1/18.
110. London School of Hygiene & Tropical Medicine, Arthropod Control Product Testing Centre, London, UK. Ovicidal and Adulticidal Efficacies of Formulated Product containing Benzyl Benzoate and Disulfiram. J.M. Clark, P.I., \$20,040.00. 8/5/18-10/1/18-10/30/17.
111. MA Department of Agricultural Resources (AR0000000010556) MDAR FY19 MPAL HEMP Technician. PI: J. Marshall Clark, Director of Laboratory, Total Direct Costs \$169,716 from 7/17/2018 -6/30/2019.