

GARY M. RAND, Ph.D.

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Ecotoxicology and Risk Assessment Lab.
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EXPERIENCE SUMMARY-INDUSTRIAL, CONSULTING & ACADEMIC

Direct multidisciplinary environmental staffs, prepare budgets, long-range planning.

Develop aquatic ecotoxicology and ecological risk assessment programs.

Design and conduct of laboratory and field research programs for aquatic (freshwater, estuarine, marine) and terrestrial studies to assess the safety of chemical compounds including pesticides, metals, petroleum hydrocarbons, polychlorinated biphenyls and pharmaceuticals and personal care products (PPCPs; microconstituents) to the environment.

Knowledge of environmental fate, effects and risk models.

Prepare human health and ecological risk assessments for regulatory submissions.

Natural resource damage assessments for hazardous waste sites.

Coordinate and direct activities related to water pollution, hazardous waste sites/groundwater/soil contamination, effluent biomonitoring (industrial/municipal wastewater) and sediment quality.

Knowledge of CERCLA/RCRA, MPRSA, CZMA, CWA and NPDES program, biological/toxicity techniques and chemical-specific analyses to assess effluent discharges to conduct studies to determine cause(s) of toxicity (TIEs) and develop remediation strategies (TREs).

Knowledge of environmental regulatory requirements (FDA, CWA, FIFRA, TSCA, EU) applicable to ecotoxicological activity and development of compounds for U.S. and international registration.

Toxicology support of environmental litigation.

Liaison with trade associations, agrochemical and pharmaceutical industries, U.S. and international regulatory agencies.

Provide counsel in environmental risk analysis to industry/regulatory agencies in U.S. and in Europe.

Senior editor of book series in ecotoxicology/environmental chemistry.

PROFESSIONAL EXPERIENCE

Full-time Academic Experience

Florida International University, PROFESSOR and DIRECTOR OF THE ECOTOXICOLOGY & RISK ASSESSMENT LABORATORY, Department of Earth and Environment, and Southeast Environmental Research Center (SERC), August 1996-present.

Designed and constructed new state-of-the-art ecotoxicology laboratory building (<http://www.fiu.edu/~randg>) on Biscayne Bay which is NELAP accredited. Conducts research on: acute and chronic effects of pesticides, metals, PAHs, PCBs, microconstituents (PPCPs), nanoparticles and other foreign chemicals and materials on freshwater, estuarine, marine, wetland and terrestrial ecosystems; effects of wastewaters and contaminated soils/sediments and identification of toxics (toxicity identification evaluations) and appropriate pollution remediation strategies (toxicity reduction evaluations). Prepares aquatic probabilistic ecological risk assessments to define potential for ecological effects at the community, population and ecosystem levels and determining impact of land use changes on water/sediment quality. Present research on ecosystems in South Florida from the St. Lucie River watershed to the Florida Keys including Everglades (e.g., Florida Bay), and Biscayne National Parks (e.g., Biscayne Bay) and Big Cypress National Preserve.

Teach undergraduate courses (3 credits each): Introduction to Environmental Sciences, Environmental Resources and Pollution, Water Resources and Water Quality Laboratory. Teach graduate courses (3 credits each): Environmental Resources Management, Ecotoxicology, Ecological Risk Assessment. Designed curricula for undergraduate water resources lecture, water quality laboratory and graduate courses in ecotoxicology and risk assessment.

Member of Graduate Faculty with Dissertation Advisor Status. Chair M.S./Ph.D. committees. Support graduate students, technicians and post-doctoral research associates.

Part-time Academic Experience

Nova Southeastern University, Oceanographic Center, ADJUNCT PROFESSOR, Ecotoxicology/Risk Assessment- September 1994 to 1999.

Teach graduate courses (3 credits each)

- Fundamentals of Aquatic Ecotoxicology (December 1994, 1995, 1996, 1999)

- Biological Effects and Risks of Chemicals in the Aquatic Environment

(April 1995, September 1996)

- Biostatistics (June 1996, 1997)

Chair/member of M.S. committees (2) and curriculum committees.

University of Miami, Rosentiel School of Marine and Atmospheric Science - 1994 to 1997. Member of Ph.D. committees in Ecotoxicology.

University of South Florida, College of Public Health, Department of Environmental and Occupational Health, ADJUNCT ASSOCIATE PROFESSOR- August 1992 to August 1993.

Drexel University, Environmental Studies Institute, ADJUNCT ASSOCIATE PROFESSOR- February 1983 to February 1985. Teach graduate courses in aquatic toxicology. Advisor/sponsor for Ph.D. students. Member of Ph.D. (2) committees in aquatic toxicology.

State University of New York at Buffalo, School of Medicine, LECTURER - September, 1980 to May, 1982.

North Carolina State University, NATIONAL INSTITUTE OF HEALTH POSTDOCTORAL RESEARCH FELLOW/TRAINEE IN TOXICOLOGY, Public Health Service- November 1977 to February 1979.

Non-Academic Experience

Ecological Services Inc., SENIOR SCIENTIST & DIRECTOR, ECOTOXICOLOGY November 1994 to July 1996.

Provide counsel to agrochemical industry and regulatory agencies on the fate and effects of chemicals/materials in aquatic and terrestrial ecosystems. Prepare predictive and retrospective ecological risk assessments to support regulatory requirements for major Federal (e.g., CERCLA/SARA, CWA, FIFRA) and international statutes. Conduct field studies in freshwater, brackish, marine, terrestrial and wetland ecosystems to identify biological impact and injury and develop strategies for remedial actions when necessary for point and non-point sources of pollution. Technical support in toxic tort litigation involving potential impact of pollutants to aquatic organisms and wildlife. Administratively responsible for managing staff.

Toxikon Environmental Sciences, DIRECTOR/VICE PRESIDENT, - June 1989 to November 1994.

Designed and developed start-up environmental toxicology contract testing/research company to provide services for chemical, petroleum and pharmaceutical industries and regulatory agencies. Administratively responsible for a laboratory and field station and management of staff of approximately thirty-five to forty professionals (M.S., Ph.D.) of aquatic

ecologists, aquatic toxicologists, modelers and environmental chemists with annual budget of 3-5 million dollars. Designed and developed state-of-the-art aquatic toxicology laboratory with static and flow-through systems and microcosm field station to conduct outdoor simulated field studies to assess stress to organisms in freshwater, estuarine and marine ecosystems.

Conducts laboratory and field (microcosm, pond) studies for the chemical, petroleum and pharmaceutical industries and state and federal regulatory agencies to determine the environmental fate of chemicals (including pesticides, PAHs) and their toxicological effects on freshwater, estuarine, and marine ecosystems. Laboratory studies evaluated the acute and chronic effects of chemicals on development, growth, reproduction and survival of aquatic organisms. Field studies evaluated chemical impact on the structure and function of aquatic communities and the distribution and persistence of chemicals in different environmental matrices. Responsible for experimental design of special laboratory and field aquatic programs and protocols on sediment bound lipophilic chemicals, and to evaluate behavioral and physiological effects. Provides counsel and prepares regulatory submissions for industry on the potential hazards associated with chemical exposure in the environment regarding both biological effects to aquatic and avian/wildlife species and the fate of chemicals in water and sediment (and soil) systems. Conducts site investigations and prepares ecological risk assessments under FIFRA and at Superfund sites to describe quantitatively and qualitatively the nature and magnitude of potential risks to the environment as a result of exposure to pesticides and metals. Fate and effects models used in risk assessments. Interacts with state, federal and international regulatory agencies on ecotoxicology issues and the development and registration of agrochemicals including drugs.

**Florida Power and Light Company, CORPORATE ENVIRONMENTAL TOXICOLOGIST-
April 1987 to June 1989.**

Serve as the corporate advisor to largest electric utility company in Florida on issues of toxicological importance (e.g., air toxics, water toxics, hazardous wastes). Manage and develop all toxicology research programs to resolve/mitigate problems related to hazardous wastes/industrial effluents. Provide advice and guidance on cost-effective means to solve toxicology concerns. Prepare comments, toxicology reviews and environmental risk assessments regarding public health and ecological safety. Interact with regulatory agencies and trade associations.

Conducts laboratory and field studies on the acute and chronic effects of asbestos and effluents on freshwater and marine organisms, modeling/field validation studies on the fate of chemicals including heavy metals and petroleum in surface and groundwater and bioremediation treatment studies to degrade toxic compounds.

Corporate Toxicology, FMC Corporation, MANAGER, ENVIRONMENTAL TOXICOLOGY- August 1982 to March 1987.

Administratively responsible for the management of professional staff of 7 (including one Post-Doctoral Research Associate), preparation of budgets and long-range planning. Technically responsible for the management and design of all U.S. and international aquatic, avian and wildlife toxicology programs (i.e., totaling approximately 7 million dollars per year) to assess the safety of pesticides and other chemical compounds for registration. Programs include laboratory and field (e.g., pond, mesocosm, terrestrial) studies with aquatic (i.e., freshwater, estuarine, marine) and avian species. Conducts ecological risk assessments for various agroecosystems.

Responsible for risk assessment studies of agricultural field workers exposed to pesticides and other related matters. Coordinate activities on groundwater contamination and water pollution control. Provide technical support to corporate and division management on the fate and effects of chemicals in the environment. Interact with analytical, residue and metabolism groups to develop programs. Involved with pesticide registration process in the U.S. and in Europe including Special Review of a pesticide in the U.S. Serve as scientific liaison with state, federal and international regulatory agencies and contract facilities.

Responsible for the design and management of both intramural and extramural pesticide mammalian and microbial toxicology programs (i.e., totaling approximately 5 million dollars per year) which include genetic, acute, sub chronic and chronic (e.g., oncogenicity, reproduction) laboratory studies.

Conducts human and environmental health risk assessments. Responsible for providing toxicology support to management on health and safety assessments. Serve as liaison with trade associations, U.S. and international regulatory agencies.

Corporate Toxicology, Occidental Petroleum Corporation (Hooker Chemical & Plastics Company), ASSOCIATE CORPORATE TOXICOLOGIST- February 1979 to July 1982.

Responsible for management of staff, and the design and management of toxicology programs at various divisions of the company. Programs include acute and sub chronic mammalian studies and mutagenicity testing. Aquatic/environmental programs include studies with fish, invertebrates and birds that involve acute and chronic exposure. Also responsible for designing environmental fate studies.

Evaluation of data from mammalian and ecological toxicology programs and preparation of risk assessments on new chemicals and at hazardous waste sites in New York (Love Canal), Michigan (Montague) and California.

Provide technical support and guidance to the divisions, corporate staff (medical, industrial hygiene, safety) and management on toxicology problems and questions.

Provide reviews related to the toxicology of company products, intermediates and raw materials in order to evaluate their safety.

Set internal company occupational exposure limits for chemicals in the plant.

Provide community environmental education seminars and workshops on hazardous wastes and air, soil and sediment contamination.

Assure that toxicology policies, procedures and programs are in compliance with federal, state, and international regulations.

Initiate and coordinate biomonitoring programs at the divisions to evaluate the toxicity of effluents to aquatic life.

Provide special expertise in aquatic, environmental and mammalian toxicology and apply it to special environmental problems (e.g., waste disposal sites, groundwater contamination) and litigation.

Raytheon Company, ENVIRONMENTAL TOXICOLOGIST - February 1976 to September 1977.

Perform contract-oriented toxicity studies to assess the effects of potentially toxic substances on aquatic organisms.

Conduct field studies and hazard assessments on environmental agents.

Responsible for designing and setting up an aquatic toxicology lab.

Texas A&M University, TEACHING ASSISTANT IN GENERAL BIOLOGY AND CELLULAR BIOLOGY- September 1972 to January 1976.

Osborn Laboratories, New York Aquarium, RESEARCH ASSISTANT IN GENETICS- September 1971 to August 1972.

BOOKS

Rand, G. M., Lewis, M.A. and Klaine, S. (Editors). FUNDAMENTALS OF AQUATIC TOXICOLOGY. Third Edition. In Preparation.

Rand, G.M. and Petrocelli, S.R. (Editors). 1985. FUNDAMENTALS OF AQUATIC TOXICOLOGY: METHODS AND APPLICATIONS. Hemisphere Publishing Corporation, N.Y. 666 pp. Textbook/reference book. Recipient of honorable mention award for best Life Sciences book in 1985 at the Tenth Annual Professional and Scholarly Book Awards sponsored by the Association of American Publishers.

Rand, G.M. (Editor). 1995. FUNDAMENTALS OF AQUATIC TOXICOLOGY: EFFECTS, ENVIRONMENTAL FATE AND RISK ASSESSMENT. Second Edition. Textbook/reference book. Taylor and Francis, Washington, D.C. 1125pp.

Rand, G.M., Lewis, M.A., and Calo, P. (Editors). CURRENT TOPICS IN ECOTOXICOLOGY AND ENVIRONMENTAL CHEMISTRY. Book series in preparation. First book published on Genetics and Ecotoxicology (1998).

PAPERS AND PRESENTATIONS (*indicates my postdoctoral researchers or graduate students)

*Echols, B.S., Smith, A.J., Rand, G.M. The Use of Ephyra of a Scyphozoan Jellyfish, *Aurelia aurita*, in the Aquatic Toxicological Assessment of Macondo Oils from the Deepwater Horizon Incident. Submitted.

*Echols, B., Smith, A., Gardinali, P., Rand, G. An Evaluation of Select Test Variables Potentially Affecting Acute Oil Toxicity. Submitted.

*B.S. Echols, A.J. Smith, G.M. Rand B.C. Seda. 2015. Variability in Acute Toxicity Tests with Sensitive Life Stages of Native Gulf of Mexico Species and Factors Affecting Reproducibility of Test Endpoints. Accepted Arch. Environ. Contam. & Toxicol.

* B.S. Echols, A.J. Smith, P.R. Gardinali, G.M. Rand. 2015. Acute aquatic toxicity studies of Gulf of Mexico water samples collected following the Deepwater Horizon incident (May 12, 2010 to December 11, 2010). Chemo. 120:131-137.

*A.J. Smith, G.D. Miller, B.S. Echols, G.M. Rand. 2014. Laboratory culture, reproduction, and toxicity studies with cadmium and copper using the starlet anemone, *Nematostella vectensis*. Paper presented at SETAC 35th Annual meeting November 2014. Vancouver, BC.

*Tham C. Hoang, Gary M. Rand. 2015. Mosquito control insecticides: A probabilistic ecological risk assessment on drift exposures of naled, dichlorvos (naled metabolite) and permethrin to adult butterflies. Sci. Total Environ. 502: 252-265.

*Tham C. Hoang, Gary M. Rand. 2015. Acute toxicity and risk assessment of permethrin, naled, and dichlorvos to larval butterflies via ingestion of contaminated foliage. *Chemo.* 120: 714-721.

*Tham C. Hoang, Gary M. Rand. 2014. Effects of contaminated St. Lucie River saltwater sediments on an amphipod (*Ampelisca abdita*) and a hard-shell clam (*Mercenaria mercenaria*). *Arch Environ Contam Toxicol.* 67:224-33.

P.R. Gardinali, K. Sandoval, B. Echols, A. Smith, G.M. Rand, T. Nordtug, B. Hansen. 2013. Physical, chemical and toxicological characterization of micron size droplets created from MC-252 source oil. Presentation at Society of Environmental Toxicology and Chemistry North America 34th Annual Meeting, Nashville, Tenn.

*B.S. Echols, A.J. Smith, B.C. Seda, G.M. Rand. 2013. Native Species in Ecotoxicology: The Use of Non-Standard Organisms to Assess Impairment Following the Deepwater Horizon Oil Incident. Presentation at Society of Environmental Toxicology and Chemistry North America 34th Annual Meeting, Nashville, Tenn.

G.M. Rand, P.R. Gardinali, B.A. Stubblefield, M. Huddleston, B.S. Echols, T. BenKinney. 2012. A Comprehensive Marine Toxicity Program to Address the Potential Toxicity of Petroleum Hydrocarbons from the DWH Incident in the Gulf of Mexico. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

B. Hansen, P. Gardinali, B.A. Stubblefield, G.M. Rand, O. Pelz, T. Nordtug. 2012. Preparation and characterization of oil-water dispersions by pressurized flow injection (PFI) of oil into a continuous turbulent flow generator. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

B. Hansen, D. Altin, A.J. Olsen, I.B. Overjordet, G. Rand, W. Stubblefield, P. Gardinali, O.X. Pelz, T. Nordtug. 2012. The contribution of oil droplets to the uptake and toxicity of oil dispersions to copepods. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

K. Sandoval, I. Ley, A. Smith, B. Echols, G.M. Rand, P.R. Gardinali. 2012. Physical and chemical characterization of oil-water mixtures as toxicity exposure media: assessing composition, stability, and droplet formation. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

M.T. BenKinney, O.X. Pelz, G.M. Rand. 2012. Acute and Chronic Toxicity of Unweathered and Weathered MC252 Oil to Mysid Shrimp (*Americamysis bahia*) and Tidewater Silversides (*Menidia beryllina*). Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

*B.S. Echols, A. Smith, B. Seda, G. Rand. 2012. Use of Native Fish Species from the Gulf of Mexico to Evaluate the Toxicity of Petroleum Hydrocarbons. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

L. Alvarez-Fraga, C. Ramirez, B. Echols, G. Rand. A. Edgington, W. Stubblefield, P.R. Gardinali. 2012. Using silicone membranes to produce truly dissolved solutions of polyaromatic hydrocarbons (PAHs) used in toxicological testing. Presentation at Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting, Long Beach, Calif.

*Brausch JM, Connors KA, Brooks BW, Rand GM. 2012. Human pharmaceuticals in the aquatic environment: a review of recent toxicological studies and considerations for toxicity testing. *Rev Environ Contam Toxicol.* 218:1-99.

Oliver Pelz, John Brown, Matt Huddleston, Gary Rand, Piero Gardinali, William Stubblefield, Marie T. BenKinney, Arden Ahnell. 2011. Selection of a Surrogate MC252 Oil as a Reference Material for Future Aquatic Toxicity Tests and Other Studies. Presentation at Society of Environmental Toxicology and Chemistry North America 32nd Annual Meeting, Boston, Mass.

*Brausch JM, Rand GM. 2011. A review of personal care products in the aquatic environment: environmental concentrations and toxicity. *Chemo.* 82:1518-32.

*T.C. Hoang, G. Rand. 2011. Influence of Water Quality to Zinc Toxicity in the Florida Apple Snail (*Pomacea paludosa*). Presentation at Society of Environmental Toxicology and Chemistry North America 32nd Annual Meeting, Boston, Mass.

*T.C. Hoang, G. Rand. 2011. Effects of Zinc on Survival and Zinc Uptake in Florida Apple Snails (*Pomacea paludosa*) in an Outdoor Microcosm Study. Presentation at Society of Environmental Toxicology and Chemistry North America 32nd Annual Meeting, Boston, Mass.

*T.C. Hoang, G. Rand, R. Frakes. 2011. Toxicity of Mosquito Control Insecticides to Florida Native Caterpillars via Ingestion. Presentation at Society of Environmental Toxicology and Chemistry North America 32nd Annual Meeting, Boston, Mass.

*Hoang, T.C, Pryor, R., Rand G.M. Frakes, R. A. 2011. Use of Butterflies as Nontarget Insect Test Species and the Acute Toxicity and Hazard of Mosquito Control Insecticides. *Environ. Toxicol. & Chem.* 30: 997-1005

*Carriger J.F., Hoang, T.C., Rand, G.M., Gardinali, P. Castro, J. 2011. Acute toxicity and effects analysis of endosulfan sulfate to freshwater fish species. *Arch. Environ. Contam. & Toxicol.* 60: 281-289.

*Hoang, T.C., G.M. Rand. 2010. Short term and long term effects of copper contamination soils on Florida Apple Snails: comparison of Cu uptake between indoor and outdoor studies. Presentation at Society of Environmental Toxicology and Chemistry North America 31st Annual Meeting, Portland, Oregon.

*Hoang, T.C., G.M. Rand, P. R. Gardinali and J. Castro. 2010. Accumulation and depuration of endosulfan sulfate in *Gambusia affinis*. Presentation at Society of Environmental Toxicology and Chemistry North America 31st Annual Meeting, Portland, Oregon.

*Brausch, J., P.R. Gardinali and G.M. Rand. 2010. Caution - Reclaimed Water Do Not Drink. How does Whole Effluent Testing of Pharmaceuticals Compare to Individual Compounds? Presentation at Society of Environmental Toxicology and Chemistry North America 31st Annual Meeting, Portland, Oregon.

*Brausch, J., and G.M. Rand. 2010. Does low-level pesticide exposure affect behavior and AChE activity in sailfin mollies (*Poecilia latipinna*)? Society of Environmental Toxicology and Chemistry North America 31st Annual Meeting, Portland, Oregon.

*Tham C. Hoang, Gary M. Rand, Piero R. Gardinali, Joffre Castro. 2010. Bioconcentration and depuration of endosulfan sulfate in mosquito fish (*Gambusia affinis*), *Chemosphere*, Vol. 84, No. 5, pp. 538-543.

*Tham C. Hoang, Rachel L. Pryor, Gary M. Rand, Robert A. Frakes. 2010. Bioaccumulation and toxicity of copper in outdoor freshwater microcosms, *Ecotoxicology and Environmental Safety*, Vol. 74, No.4, pp 1011-1020.

*Carriger, J.F., T.C. Hoang, and G.M. Rand. 2010. Survival analysis of mosquitofish (*Gambusia affinis*) and least killifish (*Heterandria formosa*) exposed to endosulfan sulfate. *Archives of Environmental Contamination and Toxicology* 58: 1015-1022.

Rand, G.M., J.F. Carriger, P.R. Gardinali, and J. Castro. 2010. Endosulfan and its metabolite, endosulfan sulfate, in freshwater ecosystems of South Florida: A probabilistic aquatic ecological risk assessment. *Ecotoxicology* 19: 879-900.

*Carriger, J.F., and G.M. Rand. Submitted. Copper in Saltwater Ecosystems of South Florida: Use of Probabilistic Aquatic Risk Assessment Methodology and Application of Kriging Methods to Determine Potential Systems at Risk.

*Carriger, J.F., J. Castro and GM Rand. Submitted. Hazard Assessment of Inflow and Outflow Monitoring Stations at the Water Conservation Areas, South Florida.

*Carriger, J.F., G.M. Rand, and T.C. Hoang. 2010. South Florida water and soil/sediment quality: Use of the U.S.EPA ecological risk assessment framework to assess potential risks. 2nd University of Florida Water Institute Symposium, February 24, 2010, Gainesville, FL.

*Carriger, J.F., and G.M. Rand. 2009. Copper in saltwater ecosystems of South Florida: An ecological risk assessment. University of Florida IFAS 2009 Indian River Lagoon Research Forum, December 2, 2009, Fort Pierce, FL.

*Hoang, T.C., G.M. Rand, J.F. Carriger, and R. Frakes. 2009. Wing exposure and risk assessment of mosquito control insecticides to Florida native butterflies. Society of Environmental Toxicology and Chemistry North America 30th Annual Meeting, New Orleans, LA.

Rand, G.M. and Hoang, T. Copper desorption and toxicity to aquatic organisms in south Florida. 1st International Conference on Environmental

Pollution, Restoration and Management, March 1-5, 2010, Ho Chi Minh City, Vietnam

*Hoang, T. and Rand, G.M. Desorption, bioavailability, bioaccumulation and toxicity of copper to aquatic organisms in south Florida. 2009 Indian River Lagoon Research Forum, University of Florida, 2009

*Carriger, J. and Rand, G.M. Copper in saltwater ecosystems of south Florida: An ecological risk assessment 2009 Indian River Lagoon Research Forum, University of Florida, 2009

*Hoang, T., Schuler, L. and Rand, G.M. Effects of Copper in Flooded Florida Agricultural Soils on *Hyalella azteca*. Annual Meeting of SETAC North America, New Orleans, 2009

*Chronic Outdoor freshwater microcosm study: effects of Copper on the aquatic community. Annual Meeting of SETAC North America, New Orleans, 2009

*Hoang, T.C. and Rand, G.M. 2009. Exposure Routes of Copper: Short Term Effects on Survival, Weight, and Uptake in Florida apple snails (*Pomacea paludosa*). *Chemosphere* 76: 407-414.

Rand, G.M., and Schuler, L.J. 2009. Aquatic risk assessment of Metals in Sediment from South Florida Canals. *Soil and Sediment Contamination* 18: 155-172.

*Hoang, T.C., Schuler, L.J., Rogevich, E.C., Bachman, P.M. and Rand, G.M. 2009. Copper fate and toxicity following multiple floodings of agriculture soils: an issue in Everglades restoration. *J. Water, Air & Soil Poll.* 199:79-93.

*Hoang, T.C., Schuler, L.J., and Rand, G.M. 2009. Effects of copper in flooded agriculture soils on *Hyalella azteca*. *Arch. Environ. Contam. Toxicol.* 56: 459-467.

*Rogevich, E.C., Hoang, T.C. and Rand, G.M. 2009. The effects of sublethal chronic copper exposure on the growth and reproductive success of the Florida apple snail (*Pomacea paludosa*). *Arch. Environ. Contam. Toxicol.* 56: 450-458.

*Schuler, L. J. and Rand, G.M. 2008. Aquatic Risk Assessment of Herbicides in South Florida Ecosystems. *Arch. Environ. Contam. Toxicol.* 54: 571-583.

*Hoang, T.C., Rogevich, E.C., Rand, G.M., Gardinali, P., Frakes, R.A., and Bargar, T.A. 2008. Copper Desorption in Flooded Agricultural Soils and Toxicity to the Florida Apple Snail (*Pomacea paludosa*): Implications in Everglades Restoration. *Environ. Pollut.* 154: 338-347.

*Rogevich, E.C., Hoang, T.C., and Rand, G.M. 2008. The Effects of Water Quality and Age on the Acute Toxicity of Copper to the Florida Apple Snail, *Pomacea paludosa*. *Arch. Environ. Contam. Toxicol.* 54: 690-696.

Rand, G.M., and Bachman, P.M. 2008. South Florida Ecosystems. *Ecotoxicology* 17: 565-568.

*Hoang, T.C., Rogevich, E.C. Rand, G.M., and Frakes, R.A. 2008. Copper Uptake and Depuration by Juvenile and Adult Florida Apple Snails (*Pomacea paludosa*). *Ecotoxicology* 17: 605-615.

- *Schuler, L.J., Hoang, T.C. and Rand, G.M. 2008. Aquatic Risk Assessment of Copper in Freshwater and Saltwater Ecosystems of South Florida. *Ecotoxicology* 17: 642-659.
- *Carriger, J.F. and Rand, G.M. 2008. Aquatic Risk Assessment of Pesticides in Surface Waters in and Adjacent to Everglades and Biscayne National Parks: I. Hazard Assessment and Problem Formulation. *Ecotoxicology* 17: 660-679.
- *Carriger, J. F., and Rand, G.M. 2008. Aquatic Risk Assessment of Pesticides in Surface Waters in and Adjacent to Everglades and Biscayne National Parks: II. Probabilistic Analyses. *Ecotoxicology* 17: 680-696.
- *Lounsbury-Billie, M.J., Rand, G. M., Cai, Y. and Bass Jr., O.L. 2008. Metal concentrations in Osprey (*Pandion haliaetus*) Populations in the Florida Bay Estuary. *Ecotoxicology* 17: 616-622.
- *Bachman, P., and Rand, G.M. 2008. Effects of Salinity on Native Estuarine Fish Species in South Florida. *Ecotoxicology* 17: 591-597.
- *Carriger, J.F, Rand, G.M. and Perry, W.B. 2006. Chemicals of Potential Ecological Concern in Sediment from South Florida Canals: A Pesticide Ecological Risk Prioritization. *Soil & Sediment Contamination* 15: 21-45.
- Rand, G.M. and Gardinali, P. 2004. South Florida Ecosystems. *Ecotoxicology* 13: 179-184.
- Pfeuffer, R.J. and Rand, G.M. 2004. South Florida Ambient Pesticide Monitoring Program. *Ecotoxicology* 13: 195-206.
- Rand, G.M. et al. 2004. Sediment Toxicity in the St. Lucie River Watershed and Everglades Agricultural Area. *Ecotoxicology* 13: 261-274.
- Rand, G. M. 2004. Fate and Biological Effects of the Insecticide-Miticide Chlorfenapyr in Outdoor Aquatic Microcosms. *Ecotoxicology & Environmental Safety* 58: 50-60.
- Rand, G.M. Wheat, J. V., Carriger, J.F and Lee, T.A. 2003. An Automated Overlying Water-Renewal System for Sediment Toxicity Studies. *Environ. pollut.* 122: 169-175.
- Rand, G.M. Carriger, J.F., Lee, T.A., Pfeuffer, R.J. and Fink, L.E. 2003. Sediment Toxicity in Central and South Florida Ecosystems. *Bull. Environ. Contam. and Toxicol.* 70: 494-501.
- Rand, G.M., Carriger, J.F., Lee, T.A., Pfeuffer, R.J .. Sediment Toxicity in the St. Lucie River Watershed and Everglades Agricultural Area. *Ecotoxicology* 13: 261-274.
- Rand, G. M. 2002. Hazard Assessment of Resmethrin: I. Effects and Fate in Aquatic Systems. *Ecotoxicol.* 11: 101-111.
- Rand, G.M. 2001. Hormesis and Ecological Risk Assessment. *Human and Experim. Toxicol.* 20: 525-526. Invited paper.
- Rand, G. M. and Carriger, J. F. 2001. U.S. Environmental Law Statutes in Coastal Zone Protection. *Environ. Tox. & Chem.* 20: 115-121. Invited paper. Special Annual Review edition on Coastal Ecosystems.

- Rand, G. M., Clark, J.R. and Holmes, C.M. 2001. The Use of Outdoor Freshwater Pond Microcosms: III. Responses of Phytoplankton and Periphyton to Pyridaben. *Environ. Tox.* 16: 96-103.
- Rand, G. M. and Clark, J. R. 2000. Hazard/Risk Assessment of Pyridaben: I. Aquatic Toxicity and Environmental Chemistry. *Ecotoxicology* 9:153-164.
- Rand, G. M. and Clark, J. R. 2000. Hazard/Risk Assessment of Pyridaben: II. Use of Outdoor Aquatic Toxicity Studies and the Water Effect Ratio. *Ecotoxicology* 9:165-173.
- Rand, G. M., Clark, J.R. and Holmes, C.M. 2000. The Use of Outdoor Freshwater Pond Microcosms: II. Responses of Biota to Pyridaben. *Environ. Tox. & Chem.* 19: 396- 404.
- Rand, G. M. Clark, J.R. and Holmes, C.M. 2000. The Use of Outdoor Freshwater Pond Microcosms: I. Microcosm Design and Fate of Pyridaben. *Environ. Tox. & Chem.* 19: 387-395.
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*Schuler, L., G. Rand. Aquatic Risk Assessment of Herbicides in Freshwater Ecosystems of South Florida. Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Rogevich, E.C., T.C. Hoang, G.M. Rand. The Effects of Sub-lethal Chronic Copper Exposure on the Growth and Reproductive Success of the Florida Apple Snail (*Pomacea paludosa*). Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Hoang, T.C., G. M. Rand, R.A. Frakes, R.H. Pierce. Acute Toxicity of Mosquito Control Insecticides to Native Florida Butterflies. Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Hoang, T.C., G.M. Rand. Short-term effects of various copper exposure routes on survival, growth, and uptake by Florida apple snails (*Pomacea paludosa*). Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Bachman, P.M., G.M. Rand, E.P. Smith. Behavioral Effects of Salinity Change on Estuarine Fish in South Florida. Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Hoang, T.C., G.M. Rand. Inhibition of copper on whole body uptake concentrations of osmotic ions in Florida apple snail (*Pomacea paludosa*): Implications in mechanisms of toxicity and detoxification. Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Carriger, J.F., T.C. Hoang, G.M. Rand. Survival analysis of mosquitofish (*Gambusia affinis*) and least killifish (*Heterandria formosa*) exposed to endosulfan sulfate. Paper presented at the 29th Annual Meeting of the Society of Environmental and Toxicology. November 2008. Tampa, FL.

*Carriger, J.F., G.M. Rand. Aquatic Risk Assessment of Pesticides in Surface Waters in and Adjacent to Everglades and Biscayne National Parks. Paper presented at the Greater Everglades Ecosystem Restoration Meeting. July 2008. Naples, FL.

*Hoang, T.C., E.C. Rogevich, G.M. Rand, P.R. Gardinali, R.A. Frakes. Bioavailability of Copper in Flooded Agricultural Soils and Toxicity to the Florida Apple Snail (*Pomacea paludosa*). Paper presented at the Greater Everglades Ecosystem Restoration Meeting. July 2008. Naples, FL.

Rand, G.M., J.F. Carriger, P.R. Gardinali and J. Castro. Aquatic Probabilistic Ecological Risk Assessment of Endosulfan in South Florida. Paper presented at the Greater Everglades Ecosystem Restoration Meeting. July 2008. Naples, FL.

Rand, G.M. Aquatic Probabilistic Risk Assessment of Copper (Cu) for South Florida Freshwater and Saltwater Systems, including the St. Lucie/Indian River Area. Paper presented at the St. Lucie River/Indian River Lagoon Research Forum. December 5, 2007. University of Florida, IFAS, Indian River Research and Education Center, Ft. Pierce, FL.

*Schuler, L. J. and Rand, G.M. Aquatic Risk Assessment of Photosystem II Inhibitors in South Florida Ecosystems. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Schuler, L. J., Hoang, T. C. and Rand, G.M. Aquatic Risk Assessment of Copper in Freshwater and Saltwater Ecosystems of South Florida. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Hoang, T.C., Schuler, L.J., Rogevich, E.C., Bachman, P.M. and Rand, G.M. Desorption and Toxicity of Copper Following Multiple Flooding Events From Agriculture Soils. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Hoang, T.C., Rogevich, E.C., Rand, G.M., Frakes, R.A., and Bargar, T.A. Copper Uptake and Depuration by Juvenile and Adult Florida Apple Snails (*Pomacea paludosa*): Bioconcentration and Bioaccumulation Factors. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Rogevich, E.C., Hoang, T.C., and Rand, G.M. The Effects of Water Quality and Age on the Acute Toxicity of Copper to the Florida Apple Snail, *Pomacea paludosa*. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Bachman, P.M. and Rand, G.M. Florida Bay: A Risk Assessment for Salinity to Make Management Decisions. Paper presented at the 28th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2007. Milwaukee, WI.

*Bachman, P., Rand, G.M., and Perry, W.B. Physiological and behavioral responses of estuarine fish to salinity change: Implications towards the Comprehensive Everglades Restoration Plan (CERP). Paper presented at 27th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2006. Montreal.

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the Society of Environmental Toxicology and Chemistry. November 2006. Montreal.

Rand, G.M. et al. An Ecological Risk Assessment of pesticides and Metals from a Three-Year Monitoring Study for Everglades and Biscayne National Parks. Paper presented at the 2006 Greater Everglades Ecosystem Restoration Conference. June 5-9, 2006. Sponsored by USGS, US Army Corps of Engineers, National Park Service, University of Florida-IFAS, and S. Florida Water Management District.

Rand, G.M., Gardinali, P.R., Perry, W.B., Carriger, J.F., Tompkins, M.S. and Fernandez, A. Aquatic Ecological Risk Assessment: Florida Bay and South Biscayne Bay. Paper presented at the 2005 Florida Bay and Adjacent Marine Systems Science Conference. Duck Key, Fl. December 11-14, 2005.

*Bachman, P., Rand, G.M. and Perry, W.B. Physiological and Behavioral Responses of Estuarine Fish to Salinity Changes in Florida and Biscayne Bays. Paper presented at the 2005 Florida Bay and Adjacent Marine Systems Science Conference. Duck Key, Fl. December 11-14, 2005.

Rand, G.M. Contaminants: Pesticides in South Florida Ecosystems. Invited paper presented to the National Academy of Sciences Committee on Independent Scientific Review of Everglades Restoration Progress. Key Largo, Florida. June 27, 2005.

*Bachman, P.M., Rand, G.M., Perry, W.B. Physiological Performance Measures and Tolerance Limits for Estuarine Indicator Species in South Florida. Invited paper to be presented at 25th Annual Meeting and 4th World Congress of the Society of Environmental Toxicology and Chemistry. November 2004. Portland, OR.

Rand, G.M. et al. Ecological Risk Assessment of Contaminants in Sediment from South Florida Aquatic Ecosystems. To be presented at the 1st Annual National Conference on Ecosystem Restoration. December 2004. Orlando, FL.

Rand, G. M. and Carriger, J.F. Sediment Risk Assessment of South Florida Canals. Invited paper to be presented at the 19th Annual International Conference on Soils, Sediment and Water. University of Mass., Amherst. October 20-23, 2003.

*Fernandez, A., Jaffe, R., Rand, G., Cai, Y., Cejas, M. and Perry, W. Regional distribution of organic contaminants and trace metals in fish tissue from Everglades National Park. 24th Annual Meeting, Society of Environmental Toxicology and Chemistry (SETAC), November 13, 2003.

Rand, G.M. and Carriger, J.F. Screening Level Probabilistic Aquatic Ecological Risk Assessment of Canal C-111 and Adjacent Coastal Areas. Paper presented at the Joint Conference on the Science and Restoration of the Greater Everglades and Florida Bay Ecosystem. April 2003. Palm Harbor, FL.

*Fernandez, A., Jaffe, R., Rand, G., Cai, Y., and Cejas, M. Distribution and occurrence of inorganic and organic contaminants in sediments and whole fish tissue from Everglades and Biscayne National Parks. Joint Conference on the Science and Restoration of the Greater Everglades and Florida Bay Ecosystem (GEER) April 13-18, 2003.

Rand, G.M., Wetzell, D.L., Bachman, P., Perry, W.B., and Serafy, J.F.

Physiological Performance Measures and Tolerance Limits for Estuarine Indicator Species in South Florida. Invited paper presented at 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2002. Salt Lake City, UT.

*Carriger, J.F., Rand, G.M., Chen, L., Williams, E.B., Quesada-Embid, M., Chen, L.M., Mahabir, S. and Coronel, L. . Probabilistic Aquatic Ecological Risk Assessment of Pesticides in the C-111 Canal System in South Florida. Paper presented at 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2002. Salt Lake City, UT.

Rand, G.M. Aquatic Risk Assessment of Adult Mosquito Control Agents. Invited paper at the Florida Keys National Marine Sanctuaries Mosquito Control workshop. Sponsored by DEP and NOAA. October 15 2002. Marathon, FL.

Rand, G.M. Overview of Ecotoxicology and Risk Assessment in South Florida Ecosystems. Invited paper at the Contaminants and Biogeochemistry Workshop for Greater Everglades Ecosystem Restoration (GEER). Sponsored by U.S.G.S. May 29 2002. Ft. Lauderdale, FL.

*Fernandez, A., Cejas, M., Rand, G.M., Jaffe, R., Cai, Y. and Gardinali, P. Distribution and Occurrence of Inorganic and Organic Contaminants in Sediments from Everglades and Biscayne National Parks. Paper presented at 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2002. Salt Lake City, UT.

Rand, G.M., Carriger, J.F., and Lee, T. Sediment Toxicity in the Central and South Florida Ecosystem. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore, MD.

Rand, G.M. and Mahabir, S. Initial Hazard Assessment of South Florida Ecosystems. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore, MD.

*Lounsbury-Billie, M.J., Rand, G.M., Cai, Y., Mealey, B. and Bass, O. Mercury and Trace Metal Concentrations in Osprey Populations in Florida Bay. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore MD.

*Coronel, L.R., Rand, G.M., Mathee, K. and Schaffe, C. Atrazine Affects the Ability of Post-Larval Shrimp (*P. Vannamei*) to Resist Infection by *Vibrio harveyi*. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore MD.

*Mahabir, S.P., Rand, G. M., Gardinali, P., and Jayachandran, K. Effects of MTBE on soil organisms. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore MD.

*Lee, T.A., Rand, G. M., Gardinali, P. and Jochem, F. Effect of Irgarol 1051 on the Relationship between the Sea Anemone *Aiptasia pallida*, and its' Zooxanthellae Algae. Paper presented at 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 2001. Baltimore MD.

*Lounsbury-Billie, M.J., Rand, G.M., Cai, Y., Mealey, B. and Bass, O. Trace Metal Concentrations in Osprey Populations in Everglades National Park. Paper presented at Greater Everglades Ecosystem Restoration Science Conference. December 2000. Naples, FL.

Rand, G.M., Carriger, J.F. and Lee, T.A. Assessment of Sediment Toxicity in the St. Lucie River Watershed and Everglades Agricultural Area. Paper presented at Greater Everglades Ecosystem Restoration Science Conference. December 2000. Naples, FL.

Rand, G.M., Carriger, J.F. and Lee, T.A. Initial Hazard Assessment of Sediment Toxicity in St. Lucie River Watershed and Everglades Agricultural Area. Paper presented at 21st Annual Meeting of the Society of Environmental Toxicology. November 2000. Nashville, TN.

Rand, G. M. et al. Linking Exposure, Toxicological Effects and Risk Management To Sustainable Restoration of Aquatic and Wildlife Ecosystems in South Florida. Paper presented at the 1999 Florida Bay and Adjacent Marine Systems Science Conference. November 1999. Key Largo, FL.

Rand, G. M. Comparative Aquatic Hazard Assessment of Resmethrin. Paper presented at 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 1999. Philadelphia, Pa.

*Glickfield, G. J. and Rand, G. M. Modeling Exposure to Ethion and Bromacil in St. Lucie County's C-25 Canal and Indian River Lagoon. Paper presented at 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 1999. Philadelphia, Pa.

Rand, G. M., Clark, J.M. and Holmes, C.A. Fate and Effects of the Insecticide/Miticide, Pyridaben Using a Freshwater Outdoor Microcosm System. Paper presented at the 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 1998. Charlotte, N.C.

Pierce, R. H., Henry, M. S. and Rand, G. M. Hazard Assessment of Mosquito Insecticides in South Florida. Paper presented at the 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 1998. Charlotte, N.C.

Rand, G. M. A Summary of Workshop: Ecological Risk of Toxic Substances in Florida Ecosystems. Invited paper presented at the 19th Annual Meeting of the Society of Environmental Toxicology and Chemistry. November 1998. Charlotte, N.C.

Rand, G. M. 1996. Aquatic Toxicology: Evolution of the Science/Strengths and Limitations of Aquatic Organisms as Models for Human Health Risk Assessment. An invited paper presented in a continuing education course at the Society of Toxicology Annual Meeting, March, 1996. Anaheim, California.

Rand, G.M. and Zeeman, M.G. 1995. TSCA/FIFRA Ecological Risk Assessment Approaches. Invited paper presented at a workshop on State of Practice of Risk Assessment in Human Health and Environmental Decision Making, Florida Center for Environmental Studies. Florida Atlantic University. December 1995. Tallahassee, Florida.

Rand, G.M. 1995. Methods and Strategies in Ecological Risk Assessment:

Implications for Risk Management. Invited paper presented at Third Annual Florida Environmental Expo. September 1995. Tampa, Florida.

Rand, G.M. 1995. Ecological Risk Assessments: Structure and Application. An invited paper presented at the 18th Annual Conference of the Florida Association for Water Quality Control. June 1995. Naples, Florida.

Rand, G.M. 1994. History of Studies in Risk Assessment. Environmental Toxicology and Denver, Colorado.

Aquatic Toxicology and Evolution of Field An invited paper presented at the Society Chemistry Annual Meeting, November 1994.

Rand, G.M. 1994. The Use of an Outdoor Aquatic Microcosm System to Assess Pesticide Stress on Aquatic Organisms. Presented at the Eighth International Congress on Pesticide Chemistry, ACS, July, 1994, Washington, D.C.

Rand, G.M. 1993. Design and Aquatic Ecology of a Freshwater Microcosm. Presented at The Society of Environmental Toxicology and Chemistry Annual Meeting, November, 1993. Houston, Texas.

Rand, G.M. 1991. NATO Advanced Workshop on Biomarkers. Invited to participate. May 11-18, Texel, The Netherlands. Co-authored paper entitled Development and Validation of Biomarkers. In Biomarkers Research and Application in the Assessment of Environmental Health, D.B. Peakall and L.R. Shugart, eds. NATO ASI Series. Springer-Verlag, New York, N.Y., 1991.

Rand, G.M. 1990. Ecological Risk Assessment. An invited paper presented at the U.S.-Japan Pesticide Workshop sponsored by the National Science Foundation, September, 1990. Rockville, Maryland. Published in 1992.

Rand, G.M. 1988. Biological Treatment of Soil Contaminated with NO.6 Fuel Oil. A paper presented at the Society of Environmental Toxicology and Chemistry Annual Meeting, November, 1988. Arlington, Virginia.

Rand; G.M., M.A. Palmieri and R.A. Robinson. permethrin: Chronic Fish Toxicity and Bioavailability to Aquatic Organisms. A paper presented at the Society of Environmental Toxicology and Chemistry Annual Meeting, November, 1986. Arlington, Virginia.

Palmieri, M.A. and G.M. Rand. Hazard Evaluation of the Herbicide, Clomazone to Aquatic Organisms and Wildlife. A paper presented at the Society of Environmental Toxicology and Chemistry Annual Meeting, November, 1986. Arlington, Virginia.

Rand, G.M. Pyrethroids and Ecological Risk Assessment. An invited paper presented at the National Academy of Sciences, March, 1986. Washington, D.C.

Rand, G.M., D.E. Nye and G. Chester. Worker exposure to and adsorption of cypermethrin during aerial application of an "ultra low volume" formulation to cotton. A paper presented at the "Society of Toxicology 25th Annual Conference", March, 1986. New Orleans, LA.

Rand, G.M., J.R. DeProspero, R.A. Robinson and M.J. Fletcher. Carbosulfan:

Aquatic Toxicology. A paper presented at the "Society of Toxicology 24th Annual Conference", March, 1985. San Diego, California.

Rand, G.M. Agricultural Chemicals: Strategies and Concerns for the Environmental Chemist. An invited paper presented at the Association of Official Analytical Chemists Centennial Meeting, October 29- November 1, 1984.

Rand, G.M., J.R. DeProspero and M.J. Fletcher. Chronic Effect of Dietary Administration of Carbofuran on Beagle Dogs. A paper presented at the "Society of Toxicology 23rd Annual Conference", March 12-16, 1984. Atlanta, Georgia.

Rand, G.M. The Use of Behavioral Measurements to Assess Toxicant Induced Stress in Marine Organisms. Invited paper presented at the "International Symposium of Ecotoxicological Testing for the Marine Environment", September 12-14, 1983. Ghent, Belgium. Published in symposium volume. Ecotoxicological Testing for the Marine Environment Vol. 2, G. Persoone, E. Jaspers, C. Claus, eds. European Aquaculture Society, 1984.

Rand, G.M. and J.R. DeProspero. Environmental Toxicology of Carbofuran. Paper presented at the "Fourth Annual Meeting of the Society of Environmental Toxicology and Chemistry", November 6-9, 1983. Arlington, Virginia.

Rand, G.M., P.O. Nees, C.J. Calo, D.J. Alexander and G.C. Clark. The Effects of Inhalation Exposure to Hexachlorocyclopentadiene (Hex) on Rats and Monkeys. A paper presented at the 20th annual meeting of the Society of Toxicology, March 3, 1981. Boston, MA.

Rand, G.M. and G.T. Barthalmus. The Use of an Unsignalled Avoidance Technique to Evaluate the Effects of the Herbicide 2,4 dichlorophenoxyacetic Acid in Goldfish. A paper presented at the "Third Annual Symposium on Aquatic Toxicology", October 17, 1981. Sponsored by the American Society for Testing and Materials. Published in symposium volume. Aquatic Toxicology, ASTM STP707, J.G. Eaton, P.R. Parrish, and A.C. Hendricks, eds. American Society for Testing and Materials, 1980, 341-353.

Rand, G.M. The Effect of Subacute Parathion Exposure on the Locomotor Behavior of the Bluegill Sunfish and Largemouth Bass. A paper presented at the "Symposium on Aquatic Toxicology and Hazard Evaluation", October 26, 1976. Sponsored by the American Society for Testing and Materials. Published in symposium volume. Aquatic Toxicology and Hazard Evaluation, ASTM STP634, F.L. Mayer and J.F. Hamelink, eds. American Society for Testing and Materials, 1977, 253-268.

Book Reviews

Rand, G.M. Book: Quantitative Methods in Aquatic Ecotoxicology. Soc. Environ. Toxicol. and Chemistry Newsletter March 1997.

Rand, G.M. Book: Water Pollution Biology, second edition. Bull. of Marine Science Vol. 64, Issue 2, March 1999.

Rand, G.M. Fundamentals of Ecotoxicology. Soc. Environ. Toxicol. and Chemistry Newsletter May, 1999.

Rand, G.M. Ecotoxicology. Soc. Environ. Toxicol. and Chemistry. 1999.

Rand, G.M. Fundamentals of Ecotoxicology, second edition. Soc. Environ. Toxicol. and Chemistry Newsletter July-August 2003.

Editor of Special Issues (monograph) of Journals from Workshops/Symposia

Rand, G.M., Bachman, P. and Rogevich, E. (Editors). Ecological Risk Issues in South Florida. Special Issue of Journal Ecotoxicology. 11 manuscripts, October, 2008.

Rand, G.M. and Gardinali, P.R. (Editors). 2004. South Florida Ecosystems. Journal of Ecotoxicology. 9 manuscripts. From Session of papers presented at Society of Environmental Toxicol. & Chem Symposium November, 2001.

Callahan, B., Pastorok, R., Zillioux, E., Pavlou, S.P. and Rand, G.M. (Editors). 1998. State of Practice of Risk Assessment in Human Health and Environmental Decision Making. Human and Ecological Risk Assessment Volume 4, Number 4 (Part 2). 12 manuscripts. From Workshop, Turnbull Center, Tallahassee, FL December, 1995.

RESEARCH GRANTS AWARDED

Oil droplet toxicity: Methods/protocol establishment, chemical characterization, and toxicity studies (800 K for 1.0 year (2011-2012) Funded by BP Oil)

Oil droplet toxicity: Methods/protocol establishment, chemical characterization, and toxicity studies (800 K for 1.0 year (2011-2012) Funded by BP Oil)

Effects of the Deep Water horizon Oil Spill on Marine Organisms (3,256,927 for 2.0 years (2011-2012) Funded by BP Oil)

Toxicological Assessment of Water and Oil Field Samples from the Gulf of Mexico (968K for 1.5 years (2010-2011) Funded by ENTRIX/BP Oil)

The Use of an Outdoor Microcosm System to Evaluate the Fate and Biological Effects of Zinc in Freshwater Systems (390K for 1-year-Funded by International Zinc Association; 2009-2010)

Effects of Trace Metals and Organic Contaminants in Saltwater Ecosystems of South Florida (up to 500K for 5-year cooperative agreement-Funded by NOAA; 2009-2014)

Effects and Fate of Nutrients, Pharmaceuticals and Personal Care Products (PPCPs) in Wastewaters on Aquatic Ecosystems (2.75 million for 3 years-Funded by State/Miami Dade County; 2009-2012)

Ecotoxicology Studies with Fish Fry and Potential Harmful Algae in the St. Lucie Estuarine System (90K for 1 year-Funded by NOAA; 2007-2008; third year of NOAA program-budget approved by year)

Contaminants and Adverse Effects on Aquatic Organisms of the Everglades-A Probabilistic Risk Assessment (153K for 2 years- Funded by U.S. Dept. of the Interior, National Park Service; 2007-2009)

Exposure and Ecological Effects of Adult Mosquito Control Agents: An Ecological Risk Assessment on Non-Target Organisms (Butterflies) in the Key Deer Refuge, Big Pine Key (225K for 2 years- Funded by U.S. Fish & Wildlife Service; 2006-2008)

Salinity Relationships of Epifaunal Species in Near-Shore Biscayne Bay (385K for 3 years- Funded by South Florida Water Management District; 2005-2007)

Monitoring and Risk Assessment in Everglades Restoration: Chemical Contaminants in Everglades National Park (Florida Bay), Biscayne National Park (Biscayne Bay) and Big Cypress National Preserve (2.2 million for 3 years- Funded by U.S. Dept. of the Interior, National Park Service; 2006-2009)

Fate, Uptake (Bioconcentration)/Depuration, Food Chain Transfer Bioaccumulation) and Toxicity of Copper: Use of Apple Snails (*Pomacea paludosa*) and Fish as Models for Understanding Effects on Higher Trophic Levels (216K for 2 years-Funded by U.S. Fish & Wildlife Service; 2006-2008)

Freshwater Inflow and Wastewaters into Marine Systems: Effects of Salinity Changes and Development of Numerical Water Quality Criteria for Contaminants Using Physiological Performance Measurements Relevant to Estuarine Indicator Species in South Florida (Biscayne and Florida Bays) (355k for 4 years funded by National Park Service, National Park Service; 2002-2006)

St.Lucie River/Indian River Lagoon Fish Health and Biological Performance Measures (200K for 2 years-Funded by NOAA; 2005-2007)

Sediment Bioassay and Toxicity Identification/Evaluation Methods Adaptation to the Central and South Florida System (104K for 2 years- Funded by South Florida Water Management District; 2002-2004)

Screening Level Risk Assessment to Determine Potential High Priority Contaminants and Natural Resources at Risk in Biscayne and Everglades National Parks: Critical Information Needs for the Comprehensive Everglades Restoration Plan (CERP) (747K for 3 years-Funded by U.S. Dept. of the Interior; 2001-2004)

Sediment Bioassay and Toxicity Identification/Evaluation Methods Adaptation to the Central and South Florida System (104K for 2 years Funded by South Florida Water Management District; 2002-2004)

Sediment Bioassay and Toxicity Identification/Evaluation Methods Adaptation to the Central and South Florida System (137K for 2 years Funded by South Florida Water Management District; 1999-2001)

Initial Hazard Assessment of South Florida Ecosystems (27K-Funded by U.S.Geological Survey; 2000-2001) Use of Biomarkers to Assess Stress of Chemicals on Ospreys in Florida Bay (20K- Funded by U.S. Dept. of the Interior, National Park Service; 2000)

Health Effects of Pesticides in Farm Workers (8.5K- Florida Memorial College/Funded by NIOSH; 2000)

Study of Gulf Coast Oil Contingency Plans with Respect to Remediation and Restoration (188K- collaboration with University of Miami & Nova Southeastern University: Funded by NOAA; 1996)

Evaluation of Biological Indicators for Assessment and Prediction of Adverse Ecological Impacts from Contaminants in Coastal Ecosystems (151K- collaboration with Mote Marine Laboratory: Funded by U.S.EPA Gulf of Mexico Program; 1995-1996)

CONTRACT (INDUSTRIAL)-TESTING AND RISK ASSESSMENTS

Aquatic Risk Assessment of the Pyrethroid Mosquito Adulticide Resmethrin (55K- Funded by AgrEvo Chemical Co.; 1996)

Aquatic Risk Assessment of Malathion (80K- Funded by State of South Carolina; 1994-1996)

Fate and Effects of the Insecticide-Miticide (AC303, 630 3SC) using Outdoor Microcosms (350K- Funded by American Cyanamid Co.; 1992-1994)

Aquatic Risk Assessment of the Insecticide Carbaryl (50K-Funded by Rhone-Poulenc Ag Co.; 1993-1994)

Aquatic Risk Assessment of the Pyrethroid Fenprothrin (45K-Funded by Valent Chemical Co./Sumitomo Chemical Co.; 1993)

Aquatic Risk Assessment of the Fungicide and Antifoulant Chlorothalonil (75K-Funded by ISK Biotech Co.; 1992-1993)

Fate and Effects of the Insecticide-Miticide BAS 300 11 I using Outdoor Microcosms (1.8 million- Funded by BASF Corp.; 1992-1994)

Aquatic Risk Assessment of the Herbicide, prodiamine (50K- Funded by Sandoz Crop Protection Corp.; 1991)

Laboratory Studies (Acute and Chronic) on the Fate and Effects of Chemicals (2 million/year-Funded by BASF, Monsanto, Dow Chemical, DuPont, Nissan Chemical, AgrEvo, American Cyanamid; 1989-1994)

Bioremediation and Ecological Risk of Soil Contaminated with #6 Fuel Oil (Ft. Meyers, FL) (250K-Funded by Florida Power & Light Co.; 1987-1989)

Effects of Effluents and Contaminated Sediments on Aquatic Organisms (150K- Funded by Florida Power and Light Co.; 1987-1989)

Effects of Organophosphate and Carbamate Insecticides on Birds and Wildlife populations in Florida, Texas, Iowa, Illinois, Utah and Wisconsin (5 million- collaboration with Brigham Young University: Funded by FMC Corp.; 1982-1987)

Effects of Pyrethroids (Cypermethrin, Biphenthrin), Endosulfan and

Organophosphates (Ethion) on Aquatic Ecosystems using Outdoor Ponds and Simulated Aquatic Systems (4 million-collaboration with Academy of Natural Sciences-Pennsylvania, ICI and Hoechst Corps., Makhteshim-Agan Chemical Co.: Funded by FMC Corp.; 1982-1987)

Avian/Wildlife Risk Assessment of the Insecticide Carbofuran (200K-FMC Corp.; 1983-1985); Laboratory Studies on the Acute and Chronic Effects of Pesticides on Aquatic and Avian Species (2 million-Funded by FMC Corp.; 1982-1987)

Acute and Chronic Effects of Effluents and Contaminated Sediments from the Niagara River, Great Lakes, Tacoma, Washington (500K Funded by Hooker Chemical Co./Occidental Petroleum Corp.; 1979-1982)

Assessment of Ecological Damage Adjacent to Hazardous Waste Sites at Love Canal, NY, Montague, MI, Lathrop, CA, etc. (2 million- Funded by Hooker Chemical Co./Occidental Petroleum Corp.; 1979-1982)

PROFESSIONAL AFFILIATIONS, AWARDS, MEMBERSHIPS, SCIENTIFIC ADVISORY PANELS

FIU Faculty Top Scholars Award (2011)

FIU Faculty Scholarship Recognition Award (2008)

Ad Hoc Member U.S.EPA Scientific Advisory Panel (2004)

Nonlinearity in Biology, Toxicology and Medicine (now called Dose-Response) (Founding Member, Editorial Board, 2003-present)

Biomarkers (Editorial Board, 1995-2007)

Environmental Bioindicators (Editorial Board, 2005-present)

Ecotoxicology (Editorial board, 2000-present; Associate Editor, 2000-2002; Associate Editor Marine Ecotoxicology, 2004-2007)

Editor of Book Series-Current Topics in Ecotoxicology and Environmental Chemistry (1995-present)

Ecotoxicology and Risk Management Scoping Committee for the South Florida Restoration (1998-2003)

Ecological Risk Focus Group of South Florida Forum (1998-2001) Expert Review Group for Lake Apopka North Shore Pesticide Evaluation (St. Johns River Water Management District) (1999-2003)

Society of Environmental Toxicology and Chemistry (Co-Chair Soil Advisory Committee, 1999-2001)

Agency for Toxic Substances and Disease Registry, Department of Health and Human Services (Board of Scientific Counselors, 1988-1991)

Edison Electric Institute (Chairman of Health Assessment/Toxicology Task Force, Safe Drinking Water Act Task Force, 1987-1989)

Utility Water Act Group (Biological Testing Subcommittee, Water Quality Subcommittee, 1987-1989)

Society of Environmental Toxicology and Chemistry; Charter Member (Editorial Board of Society Journal, Hazard Assessment Section 1987-1989)

Electric Power Research Institute (Air Pollution/Inhalation Toxicology Advisory Committee, 1987-1989)

National Agricultural Chemicals Association (Chairman of Environmental Toxicology and Chemistry Committee, 1985-1987)

American Association for the Advancement of Science (1976-2006) Chemical Manufacturers Association (Water Quality Task Committee, 1979-1981)

WORKSHOPS

Organized/Chaired the following sessions/workshops:

The First International Conference on Environmental Pollution, Restoration and Management. March 1-5, 2010. Ho Chi Minh City, Vietnam. Organized meeting, instructor for half-day class in "Methods in Aquatic Toxicology Testing", chaired session on "Ecological and Human Health Risk Assessment" and presented a paper.

Ecotoxicology & Risk Issues in South Florida. Sponsored by the Society of Environmental Toxicology and Chemistry Twenty-ninth Annual Meeting. November 2008. Tampa, FL. Book in preparation.

South Florida Ecosystems at Risk. Sponsored by the Society of Environmental Toxicology and Chemistry at Twenty-Second Annual Meeting. November 2001. Baltimore, Maryland. Special monograph edition of Ecotoxicology published in 2004.

Environmental Effects on South Florida Ecosystems. Sponsored by the Society of Environmental Toxicology and Chemistry at Nineteenth Annual Meeting. November 1998. Charlotte, N.C.

Workshop on Ecological Risk of Toxic Substances in South Florida Ecosystems: Linking Exposure, Toxicological Effects and Risk

Management to Sustainable Restoration of Aquatic and Wildlife Ecosystems. Sponsored by Florida International University, U.S.EPA, NOAA and USGS. October 1998. Miami, FL.

Environmental Education. Sponsored by the Society of Environmental Toxicology and Chemistry at the Seventeenth Annual Meeting. November 1996. Washington, DC.

Aquatic Toxicology. Sponsored by the Society of Environmental Toxicology and Chemistry at the Seventeenth Annual Meeting. November 1996. Washington, DC.

Toxic Substances Roundtable. Sponsored by South Florida Water Management District. October 1996. West Palm Beach, FL. Facilitator and presenter of ecological and human health risk assessment seminars.

State of Practice of Risk Assessment in Human Health and Environmental Decision Making. December 1995. Florida State University, Tallahassee, Fl. Co-edited special monograph in Human and Ecological Risk Assessment 1998, Volume 4, Number 4.

Wildlife Risk Assessment. Sponsored by the Society of Environmental Toxicology and Chemistry at the Second SETAC World Congress. November 1995. Vancouver, BC.

Avian Toxicity Field Studies. Sponsored by the National Agricultural Chemicals Association for industry, academia and the regulatory agencies. September 1986. Washington, DC.

Aquatic Toxicity Field Studies. Sponsored by the National Agricultural Chemicals Association for industry, academia and the regulatory agencies. October 1986. Washington, DC.

Pesticide Risk Assessment in Aquatic Systems. Sponsored by the Society of Environmental Toxicology and Chemistry at the Seventh Annual Meeting. November 1986. Alexandria, Virginia.

CONSULTANCIES

Companies

ACGIH
AgrEvo Chemical Co.
American Cyanamid Co.
BASF Corporation
Bayer
Camp, Dresser & McKee, Inc.

Agencies

USEPA
State Department
South Florida Water Management
Miami Dade Cty. Water & Sewer
St. Johns River Water Management

E.I. duPont de Nemours & Co.
 Dow Elanco Products Co.
 FMC Corporation
 Henckel Americas
 Hoechst-Roussel Agri-Vet Co.
 ISK Biotech
 Makhteshim-Agan (America) Inc.
 Merial Ltd.
 Monsanto Agricultural Co.
 Nissan Chemical Co.
 NOR-AM Chemical Co.
 PPG Industries, Inc.
 Reckitt-Benckiser
 Rhone-Poulenc, Inc.
 Sandoz Crop Protection Corporation
 Sumitomo Chemical America, Inc.
 The Dow Chemical Company
 Union Carbide Agricultural Products Co., Inc.
 Uniroyal Chemical Co.
 Union Oil of California
 Valent Chemical Co.
 Velsicol Chemical Co.

WORK IN PROGRESS

Publications

Books

Rand, G. M., Lewis, M.A. & Klaine, S. (Editors). FUNDAMENTALS OF AQUATIC TOXICOLOGY. Third Edition.

Chapters

Rand, G.M., and Lewis, M.A. Introduction: Basic Principles/Concepts in Aquatic Toxicology. In Rand, G. M., Lewis, M.A. & Klaine, S. (Editors). FUNDAMENTALS OF AQUATIC TOXICOLOGY. Third Edition.

Rand, G.M. The Aquatic Environment: Introduction to the Biology and Chemistry of Water and Sediment. In Rand, G. M., Lewis, M.A. & Klaine, S. (Editors). FUNDAMENTALS OF AQUATIC TOXICOLOGY. Third Edition.

Rand, G.M. Pesticides. In Rand, G. M., Lewis, M.A. & Klaine, S. (Editors). FUNDAMENTALS OF AQUATIC TOXICOLOGY. Third Edition.

EDUCATION

NIH Postdoctoral			North
Research Fellow/			Carolina
Trainee in			State
Toxicology	M.S.	B	Universi
		.	ty
Ph.D.		A	
		.	
	M.S.		

Texas A&M
Universit
y

Toxicology

Long
Island
University

Biology/
Environmental
Toxicology

City College of
the City
Univ.of New
York

Marine
Biology

Education

Hunter College
the City Univ.
of New York

Biology