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Guest Researcher, National Institute of Environmental Health Sciences (NIEHS), Free Radical Metabolism Group, Immunology, Inflammation, and Diseases, Mail Drop F0-28, Durham, NC

EDUCATION:

- **Doctor of Philosophy**, Environmental Sciences and Engineering, University of Texas at El Paso (UTEP), El Paso, TX, **2003**. Dissertation: “*Characterization of Representative Ambient Air Ultrafine and Nanoparticulate Matter in the El Paso-Juarez Metroplex: Morphology, Chemical Compositions, and Speciation*” (digital ISBN 978-0-542-06488-3).
- **Doctor of Medicine**, University of Illinois at Chicago, College of Medicine/CAHSU (1994, 4-year MD curriculum completed at UICOMP)/ Central America Health Science University (9 months for Tropical Medicine **1998**)
-U.S. Medical Licensing Exams I, II, & Clinical Skills Assessment (CSA)-completed (1998)
- **Bachelor of Science, Biochemistry**, University of Illinois at Urbana-Champaign, **1988**

ACADEMIC HONORS AND AWARDS:

- The Highest Outcome for 2016-2017 Post-Tenure Review, North Carolina Central University (NCCU)
- Research Achievement Award, College of Arts and Sciences, NCCU, 2017
- Research Achievement Award, College of Arts and Sciences, NCCU, 2012
- Presidential Outstanding Dissertation Award, College of Science/College of Engineering at University of Texas at El Paso, 2003
- Sigma Xi, Research Award, 2002

EDITORIAL & REVIEW EXPERIENCES:

- Editorial Board:
-*Austin Journal of Nanomedicine and Nanotechnology*, December 2013-Present
- Journal Review Referee:
-*Journal of Nanoparticle Research*, 2012-Present
-*Journal of Exposure Science & Environmental Epidemiology*, 2012-Present
- *Nanotechnology Review*, 2011-Present
-*Nanotoxicology*, 2010-Present
-*Environmental Justice*, 2010-Present
-*Analytical Chemistry*, 2010- Present
-*Environmental Science and Technology*, 2008- Present
-*Journal of Hazardous Materials*, 2008- Present

EXPERT PEER REVIEW/ REVIEW/PANEL

-National Institute of Environmental Health Sciences (NIEHS), 1st Global Environmental Health Day Panel, June 29, 2016, Research Triangle Park, North Carolina, U.S.A.

-U.S. Environmental Protection Agency (U.S. EPA) SBIR Air & Climate Peer Review, Feb 10-12, 17-19, 2015

- U.S. EPA National Center for Environmental Research Peer Review_GRO, July 29-31, 2014
- U.S. EPA National Center for Environmental Research Peer Review_GRO, March 06-08, 2013
- U.S. EPA Report “Global Mitigation of Non-CO₂ Greenhouse Gases”_the EPA Office of Atmospheric Programs, Climate Change Division, 2012
- Comprehensive Environmental Assessment (CEA) Prioritization Process_ Research Triangle Institute, International (RTI)/ EPA, 2012
- North Carolina Central University_Institutional Review Board (IRB), 2010-Present

PROFESSIONAL EXPERIENCE:

- Professor:

Dept. of Environmental, Earth and Geospatial Sciences, North Carolina Central University (NCCU),
July 2017- Present

-Director of Environmental Health Program at NCCU: National Environmental Health Science and Protection Accreditation Council (**EHAC**) accredited program in the Dept. of Environmental, Earth, and Geospatial Sciences, North Carolina Central University (NCCU),
Aug. 2013- Present

-Guest Researcher:

Free Radical Metabolism Group (Dr. Ronald Mason, Chief)
Immunology, Inflammation, and Diseases
National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, NC, June 2015- Present

-Interim Chair:

Dept. of Environmental, Earth, and Geospatial Sciences, North Carolina Central University (NCCU),
Aug. 2013- May 2015

-Adjunct Associate Professor:

Dept. Pharmaceutical Sciences, North Carolina Central University
March 2014- Present

-Associate Professor:

Dept. of Environmental, Earth, and Geospatial Sciences, North Carolina Central University (NCCU),
August, 2007-Present

-Research Scientist:

Dept. of Environmental, Earth, and Geospatial Sciences, North Carolina Central University (NCCU),
Dec., 2005- July, 2007

- Conduction of Congressional/EPA Co-sponsored Ambient Air Exposure Monitoring study (Moncure project, <http://www.nccu.edu/artsci/geography/newGEO/ericc.php>) and overviewing (Near-Road project, <http://www.nccu.edu/artsci/geography/newGEO/ericc.php>) as part of ERICC Environmental Justice project
- Preparation of Study Design and Quality Assurance Project Plan (QAQP)
- Preparation of Environmental Science Laboratory for certification at state level for independent research operation and consulting service

-Associate Director:

W.M.Keck Border Biomedical Manufacturing and Engineering Laboratory, Department of Mechanical Engineering, University of Texas at El Paso, TX, August, 2004—Nov., 2005, Sponsor- Ryan B. Wicker. Ph.D., Associate Dean, Research and Development, College of Engineering

- Evaluation of robust dispersing techniques of Poly-(lactic-co-glycolic)-acids (PLGA)-PEG copolymer containing Vascular Endothelial Growth Factor for guided angiogenesis and nerve cell growth in tissue engineering applications

- Growth of cells on polyurethane surface for gene expression studies in cardiovascular systems (collaboration with Stanford University, department of radiology and department of mechanical engineering)
- Configuration of conjugation methods for cell adhesion ligand RGDs and other bioactive materials for their applications in guided angiogenesis and nerve cell growth
- Synthesis of sustainable biocompatible hydrogel scaffolds using endogenous ground substances including hyaluronic acids.

-Post-doctoral Research Fellow:

Analytical Chemistry, University of Texas at El Paso, 2003-2004. Sponsor-Geoffrey Saupe, Ph.D. Associate Professor, Chemistry.

- Synthesis of Novel Photocatalytic nano-material (HTiNbO₅) for environmental remediation and energy generation

-Graduate Research Fellow: U.S. Environmental Protection Agency (EPA), Science To Achieve Results (STAR):

U.S.EPA/University of Texas at El Paso, Texas, 2002-2005 (Project #: U-91609601-0). Advisor at UTEP_Lawrence Murr, Ph.D. P.E.

- Analysis and characterization of ambient air ultra-fine and nano particulate matter for environmental health study

-Graduate Research Fellow: Southwestern Center for Environmental Research and Policy (SCERP):

U.S.EPA/University of Texas at El Paso, Texas 2002-2003 (Project #: A-02-5):

Analysis of carbon nanotubes from burning natural gases and ambient air

- Cardiopulmonary physiological responses to afternoon/night time particulate matter (PM) surge in El Paso-Juarez air basins.

-Curriculum Coordinator:

Anatomy and Physiology in Biology department, University of Texas at El Paso, 2001-2002

- Curriculum development for anatomy/physiology course
- Lecturing the course/lab coordination

-Assistant Professor:

Central America Health Sciences University, College of Medicine, 1998-2000

Supervisor: Dean, Maurice Modavi, M.D.

- Lecturing pulmonology and anatomy and physiology
- Curriculum Modification for the first two-year medical school basic science course work
- Conducting Review for U.S. medical licensing examinations for the 3rd & 4th year students

-Research Assistant:

Department of Pharmacology, University of Illinois, College of Medicine, 1994. Supervisor: Andrew Ho, Ph.D. Professor in Pharmacology

- The correlation of G-Protein level and incidence of brain tumor subtypes

TEACHING EXPERIENCE:

- North Carolina Central University (since 2006):
 - *Undergraduate* Courses: HEDU 3100 Public Health, ENSC 3600 Air Quality & Control, ENSC 3700 Water Quality and Control, ENSC 4450 Environmental Chemistry, ENSC 4400 Nanotechnology, ENSC 2100 Global Environmental Sustainability, GEOG 2010 Online Weather,
 - *Graduate* Courses: BIOG 5300 Physiology and Pharmacology, EASC 5020 Water and Minerals, EASC 5100 Field Methods and Technique, and EASC 5200 Atmospheric Dynamics
- University of Texas at El Paso (2000-2003)
 - Human Anatomy and Physiology
- Central America Health Science University, College of Medicine (1998-2000)

-Pharmacology, Physiology, Pulmonary Medicine, Endocrinology

- **Curriculum Development**

- North Carolina Central University for Environmental Health program Accreditation (National Environmental Health Science and Protection Accreditation Council)_program fully accredited in 2009 for 5 years (renewable in every 5 years)
 - Courses created for nationally accredited Environmental Health Program (EHAC)
 - i. ENSC 3600 Air Quality and Control
 - ii. ENSC 3700 Water Quality and Control
 - iii. ENSC 3900 Environmental Sampling and Analysis
 - iv. ENSC 4500 Risk Assessment and Risk Communication
- Other New Courses developed for undergraduate and graduate curriculum
 - i. ENSC 1000 Introduction to Global Sustainability
 - ii. ENSC 2100 Global Environmental Sustainability
 - iii. EASC 4500 Nanotechnology in Environmental Science
 - iv. ENSC 5350 Environmental Remediation (in progress)

RESEARCH PROJECTS and INTEREST:

Theme I: Exposure Assessment of Ambient Air Pollutants (Fine & Ultrafine PM)

- i. Ambient Air Quality Study: *Ultrafine and Fine PM, VOCs, SO_x, NO_x, Ozone*:
 1. Health Effect Institute (HEI), (06/01/2014-05/31/2017):
Land Use Regression (LUR) & exposure assessment in Near Road
 2. NCCU-RTI Co-op, (01/01/2013-09/31/2013): Commuter exposure assessment
 3. EPA-NCCU Co-op, (ERICC_12/01/2005-07/31/2007): Community Exposure Studies through Spatial and Temporal Exposure Analysis: Optic and Gravimetric methods
- ii. Characterization of *Engineered Nanomaterial and Ultrafine PMs* of traffic origins:
 1. Surface interactions in different environmental and physiological conditions
 2. PMs from Brake pads and tires (EPA/Arcadis Inc. consulting work 01/01/2012-06/31/2013)

Theme II: Risk Assessment

- i. Role of Engineered Nanomaterial in *Inflammatory process and cell death, and dopamine synthesis in nervous system*: Delineation of Nano Ag exposure induced mitochondrial dysfunction in nervous system (Parkinson's Ds; support from NCCU graduate school_08/01/2010-present)
- ii. Role of Nano Ag particles in *Pigmentation process* (NSF_BIO grant, 06/01/2010-12/31/2010, Role PI)
- iii. Persistent Organic Pollutants (*POPs*) and their genetic regulatory influence in *Type 2 Diabetic Mellitus and other inflammatory processes*
- iv. *Immuno-Spin Trapping(IST)* technique application for early detection of ROS involved pathological process (collaboration with Free Radical Metabolism group at NIEHS: 2015-present. DMPO adducts/ Oligomerized Beta-amyloid proteins are used for investigating Alzheimer's Disease.

Theme III: Micro and Nanofabrication

- i. Environmental Remediation:
- ii.

1. Development of *photocatalytic hybrid nanocomplex* (titanium and carbon nanotubes and nanofibers) for removal of organic pollutants and pathogens from fluids (ballast water and air) (NSF-PIRE, 01/01/2013-12/31/2017)
2. Development of *PEG containing triple responsive compound* (NSF-DME/MRSEC grant, SEED project, 09/01/2011-08/31/2013)
3. Nano hybrid material delivery by *Dip Pen Nanolithography* unit for nanofabrication (NCBC Biotechnology grant: 06/01/2015-05/31/2017)

GRANTS & CONTRACTS:

- National Institute of Environmental Health Sciences (**NIEHS**)/NCSU Center for Human Health & the Environment, 7/1/2016-6/31/2017), “Mechanisms of nanoparticle endocytosis and the subsequent effects on extracellular matrix deposition and epithelial cell adhesion”, Role: Co-PI
- Environmental Protection Agency/National Health and Environmental Effects Research Laboratory (**EPA/NHEERL**, 09/01/2015-08/31/2018) “Nanomaterials Hazard and Exposure Assessment Traineeships (Nano-HEAT)”. Role: PI
- Health Effect Institute (**HEI/EPA**, 06/01/2014-05/31/2017) “Characterizing the determinants of vehicle traffic emissions exposure: measurement and modeling of land-use, traffic emissions, transformation and transport” Role: PI
- North Carolina Biotechnology Center (**NCBC**)-Institutional Development Grant (06/01/2015-05/31/2017) “Developing Regional Dip Pen Nanolithography Capability” Role: Co-PI
- **NSF_PIRE** (01/01/2013-12/31/2017) “Water and Commerce: Technologies to enable environmental sustainability in global markets” Role: PI
- **EPA_ARCADIS** subcontract/consulting, 12/01/2011-8/28/2012 (EP-C-09-027: RN990272.0012.00001, “Nanoparticle collection and microscopic and gravitational analysis: Brake pads and Tires” Role: PI
- **NSF_DMR-1121107**, 09/15/2011-09/14/2016, “Triangle Material Research Science and Engineering Center, SEED group”, Role: Co-Investigator
- **NSF_BIO/ROA_DBI # 1044642**, 06/01/10-07/31/10, “Investigations on the Impacts of Nano Ag Exposure to Nervous System: Mechanisms behind Growth and Functional Abnormality” Role: PI
- **NSF_DMR- 0959679**, 02/01/10 – 01/31/12, “MRI-R2: Acquisition of an Environmental Field Emission Scanning Electron Microscope for Research and Education at North Caroline Central University” Role_Co-PI
- **Bayer USA Foundation**_08/01/11-07/31/2012, Introduction to Environmental Sustainability-An Online Course, Role: Co-Investigator
- **DUKE-NCCU STEM Partnership** award, 08/01/08-05/31/09, “Characterization of physical properties and ROS generating and radical quenching roles of carbon nanotubes (CNTs)” Role_PI
- **UNC GA**, Undergraduate Research Funding, 05/01/06-07/31/06, “Feasibility of Using Ogawa Passive Air Samplers and TSI Instruments for Barrier and Spatial Gradient Assessment”, Role_PI student support, Lauren Lawrence, NCCU
- **U.S. Environmental Protection Agency (EPA) STAR** Fellowship: Project #: U-91609601-0, 08/01/02-05/31/05, “Characterization of Representative Ambient Air Ultrafine and Nanoparticulate Matter in the El Paso-Juarez Metroplex: Morphology, Chemical Compositions, and Speciation, Role_PI

SCHOLARLY CONTRIBUTION:

-Peer-Reviewed Research Journal Articles:

1. A. Kumar, M. Triquigneaux, J. Madenspacher, K. Ranguelovaa, J. Bang, M. Fessler, R. Mason. "Sulfite-Induced Protein Radical Formation in LPS Aerosol-Challenged Mice: Implications for sulfite Sensitivity in Human Lung Disease", *Redox Biology*, May **2018**; 15: 327-334
2. P. Chakraborty, S. Selvaraj, M. Nakamura, B. Prithiviraj, A. Cincinelli, and J. Bang. "PCBs and PCDD/Fs in soil from informal e-waste recycling sites and open dumpsites in India: levels, congener profiles and health risk assessment", *Science of the Total Environment*, **2018**; 621(930-938)
3. P. Chakaraborty, S. Khuman, S. Sampath, N. Devi, J. Bang, A. Katsoyiannis. "Occurrence and Ecotoxicological Risk Assessment of Polychlorinated Biphenyls and Organochlorine Pesticides in Surface water of transboundary perennial rivers of India", *Environmental Pollution*, April, **2017**, Under review
4. H. Kim, J. Bang, S. Lee. "Gelidibacter flavus sp. Nov. isolated from activated sludge in seawater treatment system", *International Journal of Current Microbiology*, **2017**; 74(11): 1247-1252
5. Y. Subhash, J. Bang, T. You, S. Lee. "Roseomonas ruber sp. Nov., isolated from lagoon sediments". *International Journal of Systematic and Evolutionary Microbiology*. July 5, **2016**
6. Y. Subhash, J. Bang, T. You, S. Lee. "Description of Comamonas sediminis sp. Nov., isolated from lagoon sediments", *International Journal of Systematic and Evolutionary Microbiology*, April 26, **2016**.
7. W. Ma, L. Jing, A. Valladares, P.A. Li, J. Bang. "Silver nanoparticle exposure induced mitochondrial stress, caspase-3 activation and cell death: Amelioration by sodium selenite", *International Journal of Biological Sciences*. **2015**; 11(8): 860-867
8. D. Reaves, E. Ginsburg, J. Bang, J. Fleming. "Persistent organic pollutants and obesity: a worthy investigation for potential mechanisms of breast cancer promotion", *Endocrine-Related Cancer*. **2015**; 22:R69-R86
9. Bang, J. "Dear Respective Members in the Field of Nanotechnology and Nanomedicine". *Austin Journal of Nanomedicine & Nanotechnology*, Editorial. **2014**; 1(1)2.
10. J. Kim, S. Srinivasan, T. You, J. Bang, S. Park, S. Lee. "Brevibacterium ammoniilyticum sp.nov., an ammonia-degrading bacterium isolated from sludge of a wastewater treatment plant." *International Journal of Systematic and Evolutionary Microbiology*. **2013**, 63, 1111-1118
11. J. Kim, Y. Yu, F. Yen, J. Bang, T. You, S. Lee. "New strain Bacteria degrading TNT and 2,4/2,6-DNT from Explosives-Contaminated Soil." *Atlas J. of Biology*, **2012**, 2 (2): 122-130
12. J. Bang, S. Yeyeodu, N. Gilyazova, S. Witherspoon, G. Ibeanu. "Effects of Carbon Nanotubes on a Neuronal Cell Model *In Vitro*." *Atlas Journal of Biology*, **2011**, 1(3): 70-77
13. C.S. Key, D. Reaves, F. Turner, J.J. Bang. "Impacts of Silver Nanoparticle Ingestion on Pigmentation and Developmental Progression in Drosophila." *Atlas J. of Biology*, **2011**, 1(3): 52-61
14. J.J. Bang, Y.B. Anderson, S.F. DeLauder, R. Malhotra, P. Egeghy, R. Williams, D. Whitaker, C. Morrison. "Ambient Concentration Levels of VOCs and Aldehydes in Moncure, North Carolina: an Environmental Justice Case Study." *Environmental Justice*, **2011**, 4(2):91-99
15. B. Adair, J.J. Bang, Y.B. Anderson, S.F. DeLauder, M. Bradshaw, M. Lamberth, F. Meheux, R. Malhotra, R. Fortmann, P. Egeghy, R. Williams, D. Whitaker. "Water Quality Analysis in an Environmental Justice Community in Durham, North Carolina. Peer-reviewed," Proceeding's of the 2007 National Conference on Environmental Science and Technology (hard cover), Editors: Uzochukwu et al. **2009**, pp55-60. Springer
16. J.J. Bang, Y.B. Anderson, S.F. DeLauder, M. Bradshaw, F. Meheux, R. Malhotra, F. Fortmann, P. Egeghy, R. Williams, D. Whitaker. Peer-reviewed, "The Impacts of Social Capital on Environmental Risk Reduction in Moncure" . Proceeding's of the 2007 National

- Conference on Environmental Science and Technology (hard cover), Editors: Uzochukwu et al. **2009**, pp61-66. Springer
17. R. Baldauf, E. Thoma, M. Hays, R. Shroes, J. Kinsey, B. Gullett, V. Isakov, T. Long, R. Snow, A. Khylstov, J. Weinstein, F. Chen, R. Seila, D. Olson, I. Gilmour, S. Cho, N. Watkins, P. Rowley, J. Bang. "Traffic and Meteorological Impacts on Near-Road Air Quality: Summary of Methods and Trends from the Raleigh Near-Road Study." *Journal of the Air and Waste Management*, August **2008**, 58, 865-878.
 18. L.E. Murr, K.F. Soto, K.M. Garza, P.A. Guerrero, F. Martinez, E.V. Esquivel, D.A. Ramirez, Y. Shi, J. J. Bang, and J. Venzor, III. "Combustion-Generated Nanoparticulates in the El Paso, TX, USA/Juarez, Mexico Metroplex: Their Comparative Characterization and Potential for Adverse Health Effects." *International Journal of Environmental Research and Public Health*, **2006**, 3(1), 48-66
 19. G.B. Saupe, Y. Zhao, J. J. Bang, N.R. Yesu, G.A. Carballo, R. Ordonez, T. Bubphamala. "Evaluation of a new porous titanium-niobium mixed oxide for photocatalytic water decontamination." *Microchemical Journal*, **2005**, 81, 156-162
 20. J.J. Bang, L.E. Murr, E.V. Esquivel, "Collection and characterization of airborne nanoparticulates." *Materials characterization*, **2004**, 52, 1-14
 21. L.E. Murr, J.J. Bang, D.A. Lopez, R.A. Guerrero, E.V. Esquivel, A.R. Choudhuri, M. Subramanya, M. Morandi, "Carbon nanotubes and nanocrystals in methane combustion and the environmental implications." *Journal of Materials Science*, **2004**, 39, 2199-2204
 22. L.E. Murr, E.V. Esquivel, J.J. Bang, G. de la Rosa, J.C. Gardea-Torresdey, "Chemistry and nanoparticulate compositions of a 10,000 year-old ice core melt water." *The Water Journal*, **2004**, 38, 4282-4296.
 23. L.E. Murr, E.V. Esquivel, J.J. Bang, "Characterization of Nanostructure Phenomena in Airborne Particulate Aggregates and Clusters and Their Potential for Respiratory Health Effects." *Journal of Material Science: Materials in Medicine*, **2004**, 15, 237-247
 24. J.J. Bang, P.A. Guerrero, D.A. Lopez, L.E. Murr, and E.V. Esquivel, "Carbon Nanotubes and other Fullerenes Nanocrystals in Domestic Propane and Natural Gas Combustion Streams." *Journal of Nanoscience and Nanotechnology*, **2004**, 4(7), 716-718
 25. L.E. Murr, J.J. Bang, E.V. Esquivel, P.A. Guerrero, D.A. Lopez, "Carbon nanotubes, nanocrystal forms, and complex nanoparticle aggregates in common fuel-gas combustion sources and the ambient air." *Journal of Nanoparticle Research*, **2004**, 6, 241-251
 26. L.E. Murr, J.J. Bang, "Electron Microscopy Comparisons of fine and ultrafine carbonaceous and non-carbonaceous, airborne particulates." *Atmospheric Environment*, **2003**, 37, 4795-4806
 27. J.J. Bang, L.E. Murr, M.A. Chaney, "Collection and Characterization of Ultra-Fine Airborne Particulates." *Microscopy & Microanalyses*, **2003**, 9(2), 790
 28. J.J. Bang, E.A. Trillo, L.E. Murr, "Utilization of Selected Area Electron Diffraction (SAED) Patterns for Characterization of Air Submicron Particulate Matter Collected by a Thermophoretic Precipitator." *Journal of Air and Waste Management Association*, Feb. **2003**, 53, 1-10
 29. J.J. Bang, L.E. Murr, "Atmospheric nanoparticles: Preliminary studies and potential respiratory health risks for emerging nanotechnologies." *Journal of Materials Science Letters*, **2002**, 21, 361-366
 30. J.J. Bang, L.E. Murr, "Collecting and characterizing Atmospheric Nanoparticles." *Journal of the Minerals, Metals and Materials: JOM*, Dec. **2002**, 54:12, 28-30
 31. J.J. Bang, E.A. Trillo, L.E. Murr, "Thermal Precipitator for the Collection of Submicron Atmospheric particulate Matter (PM) for Transmission Electron Microscopy Examination." *Texas Journal of Microscopy*, **2002**, 33:1, 13 & 17

-Book Chapters:

32. C. Rincon, J. Anderson, J. Bang, J. Greenlee, K. Kelly, and W. Li, “Background and Recent Research on Particulate Matter in the Paso del Norte Border Region.” Book Chapter 1, The U.S.-Mexican Border Environment: An Integrated Approach to Defining Particulate Matter Issues in the Paso del Norte Region SCERP Monograph No. 12. San Diego: San Diego State University Press, **2005**.
33. W-W. Li, J.J. Bang, R.R. Chianelli, M.J. Yacaman, R. Ortiz, “Characterization of airborne particulate matter in the Paso del Norte (PdN) air quality basin in El Paso-Juarez region: morphology and Chemistry.” Book Chapter 4, The U.S. –Mexican Border Environment: An Integrated Approach to Defining Particulate Matter Issues in the Paso del Norte Region SCERP Monograph No. 12. San Diego: San Diego State University Press, **2005**.
34. H.C. Meuzelaar, N. Arnold, B. Nookala, G. Mejia, P. Medina, J. Sanchez, W-W. Li, J. J. Bang, J. Fernando, and S. Lee, “Estimating PM exposure Risks and Evaluating Health Effects of Evening PM Peaks Using GIS-Referenced Data Fusion Methods: A Pilot Study.” Book Chapter 7, In the U.S.-Mexican Border Environment: An Integrated Approach to Defining Particulate Matter Issues in the Paso del Norte Region SCERP Monograph No. 12, **2005**.

Selected Referred Conference and Invited Talk/Seminar, Proceedings & Presentations: J.J. Bang is a corresponding author for all conference presentations/papers below.

35. J. Bang, “Carbon Nanotube-Titanium Nanohybrid Material for Photocatalytic Removal of Organic Pollutants in water with mild Salinity Levels”. November 12-15, **2017**. NC American Water Works Associations –WEA, 97th Annual Conference.
36. J. Bang, “Nano and Free Radicals as Double-Edge Sword”, **Invited Talk/Seminar** at Toxicology Program, Dept. of Biology, North Carolina State University, Raleigh, NC. October 10, **2017**
37. S. Shaw, S. Kang, C. Johnson, H. Harrison, K. Kumar, T. Lim, J. Bang. “Photocatalytic Titanium-Carbon Nanotube Hybrid Material for Water Remediation”. June 28-30, 2017. Nanomaterials for Energy and Environment International Conference and Exhibition, NanoMatEn **2017**, Paris, France
38. J. Bang. “Source Apportionment of Fine Particulate Matter (PM_{2.5}) and Land Use Regression”, **Invited Talk/Seminar**. July 14, **2016**, National Institute of Environmental Research, Incheon, South Korea.
39. J. Bang. “Bioremediation as a Sustainable Method for Environmental Contamination Sites including Superfund Sites”, **Invited Talk/Seminar**. July 12, **2016**, Kyonggi University, Suwon, South Korea
40. J. Bang. “Paradigm shift for sustainable environmental & Human health”, **Invited talk/Panel Discussion**. June 29th, **2016**. 1st Annual Global Environmental Health Day, National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, North Carolina
41. S. Moon, J. Kim, S. Kim, T. Lee, J. Bang, T. You, S. Lee. “Screening of Algicidal Bacteria and Development of Bio-eco Ceramic System for Controlling Harmful Algal Blooms (Cochlodinium polykrikoides) in Fish-Raising Farm”. June 16-20, **2016**. ASM Microbe 2016, Boston, MA.
42. K. Kim, J. Kim, S. Kim, J. Bang, T. You, T. Lee, S. Lee. “Development of Microorganisms based Effluent Treatment System to Remove Nitrogen and Phosphorus from Land Fish Farms”. June 16-20, **2016**. ASM Microbe 2016, Boston, MA.
43. S. Cho, J. Kim, S. Kim, J. Bang, T. You, T. Lee, S. Lee. “Saline Wastewater Treatment from Land Fish Farm by Biological Sequencing Batch Reactor (SBR) by High Efficiency Nitrogen and Phosphorus Removing Bacteria”. June 16-20, **2016**. ASM Microbe 2016, Boston, MA.
44. C. Johnson, H. Harrison, J. Bang. “Sol-Gel Method Application for Ballast Water Remediation: Carbon Nanotubes (CNT)-Titanium Dioxide Photocatalytic Hybrid”, April 16, **2016**, NCCU Research Symposium 2016, Durham, NC

45. G. Agnihotry, J. Agnihotry, J. Bang. "Ogawa Passive Samplers for NO_x, NO₂, and Ozone Exposure Assessment in a Community nearby Local Highway", April 16, **2016**, NCCU Research Symposium 2016, Durham, NC
46. V. Taylor, K. Kumar, P. Bhatt, T. Noussi, C. Johnson, J. Bang. "RETIGO Presentation of Exposure Assessment for Particulate Matter (PM_{2.5} and Ultrafine PM (UPM) in a Community nearby Local Highways", April 16, **2016**, NCCU Research Symposium 2016, Durham, NC
47. T. Noussi, K. Kumar, V. Taylor, P. Bhatt, T. You, J. Bang, S. Lee. "Identification of a Novel Species in Animal Farm Lagoon for Bioremediation Application: *Roseomonas ruber*", April 116, **2016**, NCCU Research Symposium 2016, Durham, NC
48. J. Bang, S. Muslim, K. Kendall, C. Johnson, M. Nguyen. "Modified dispersion property of carbon nanotubes in hybrid photocatalyst containing both carbon nanotubes and titanium". December 15-20, **2015**, PacifiChem 2015, Honolulu, HI
49. S. Simon, G. Agnihotry, J. Agnihotry, K. Kumar, J. Rice, J. Budarz, J. Bang. "Pathophysiological Impact Assessment of Silver Nanoparticle Exposure on Pulmonary System: Contact Angle and Surface Tension". December 15-20, **2015**, PacifiChem2015, Honolulu, HI
50. J. Bang. "The effects of size and concentration variance of silver nanoparticles on interfacial phenomena: pulmonary pathophysiology perspective". December 15-20, **2015**, PacifiChem2015, Honolulu, HI
51. Alexandra Valladares, Wanrui Ma, Li Jing, Suresh Mehta, Ping A. Li, John J. Bang. "Selenite for Reduction of Silver Nanoparticle Exposure-Induced Mitochondrial Stress", July 30, **2015**, UKC 2015 conference, Atlanta, GA.
52. John J. Bang. "Interfacial Properties of Engineered Nanomaterial for their Potential Applications in Imaging and Drug Delivery", July 31, **2015**, UKC 2015 conference, Atlanta, GA
53. Shawn S. Muslim, Tierra Poteat, John J. Bang. "Polarizability as a Control Mechanism in Electron-Hole Separation in Nano Hybrid Photocatalyst", August 1, **2015**, UKC 2015 conference, Atlanta, GA
54. S. Muslim, J. Bang, H. Williams, T. Mulrooney. "Relating Environmental Parameters and the Invasion of Non-Native Aquatic Species via Ballast Water", Feb 10-11, **2015**, NC GIS conference, Raleigh, NC
55. S. Muslim & J. Bang, "Carbon Nanotube Containing Photocatalytic Nanohybrid Material For Sustainable Water Remediation", Nov. 16-20, **2014**, American Water Works Association, Water Quality Technology Conference 2014, New Orleans, Louisiana
56. J. Bang, N. Harris, P. Presler-Jur, A. Khlystov, D. Bell. "Health implications of exposure to local traffic-generated particulate matter (PM) in a minority community: commuters and local residents' perspectives", accepted for a presentation, October 20-24, **2014**, American Association for Aerosol Research 33rd Annual Conference, Orlando, FL.
57. S. Muslim, T. Poteat, and J. Bang, "Carbon Nanotube containing Photocatalytic Nanohybrid Material for Sustainable Environmental Remediation", accepted for presentation, August 6-9, **2014**, UKC 2014, San Francisco, CA
58. J. Bang. Workshop on Wireless Intelligent Sensor Networks (WiSeNet), "Wireless Sensor Network for a Sustainable Ecosystem and Environmental Modeling", June 4-5, **2013**, Duke University, Durham, N.C.
59. J. Bang. "Carbon Nanotubes and Hybrids in Water Filtration Technology Development", April 29-May 3, 2013, WATEREX **2013** National Institute of Environmental Research (NIER), Ministry of Environment, S. Korea
60. A. Valladares, T. Poteat, K. Levine, Z. Hendren, N. Juah, R. Bang, P. Srinivas, J. Bang. "Size and Concentration Dependent Exposure Impacts of Silver Nanoparticles (Nano Ag) on Alveolar Surface Tension". March 03-06, 2013, Environmental Health **2013**, Boston, MA

61. A. Valladares, L. Jing, N. Mendellv, P. Li, J. Bang. "Rescuing Effect of Selenium on Nanometal Toxicity" March 04-05, 2013, poster presentation, Center for Environmental Implications of Nanotechnology (CEINT) **2013**, Durham N.C.
62. P. Vereen, T. Poteat, P. Deshmukh, R. Baldauf, J. Bang. "TEM analysis for Source Identification of Carbonaceous Nanoparticles in Near Roads: Brake Pads and Tires as another Source?" March 04-05, 2013, Center for Environmental Implications of Nanotechnology (CEINT) **2013**, Durham, N.C.
63. U. Balami, G. Trivedi, J. Bang, L. Yang, D. Taylor. "Towards dual responsive (thermo-and electro-) polymeric materials". Nov. 15, **2012**, SERMAC 2012, RTP, N.C.
64. A. Valladares, L. Jing, N. Mendellv, P. Li, J. Bang. "Finding a Targeted Preventive Measure for Nano Metal Toxicity: Selenium?" April 13, **2012**, CS&T at NCCU, Durham, N.C.
65. J. Barnwell, Y. Anderson, J. Kim, J. Bang. "Comparative Pyrethroid Exposure Assessment Study among the Residents Living in Bed Bug Infested Buildings in North Carolina." April 13, **2012**, CS&T at NCCU, Durham, N.C.
66. T. Poteat, Z. Hendren, K. Levine, A. Badireddy, J. Bang. "Surface Tension Measurement for Respiratory Impact Study by Nano Silver." April 13, **2012**, CS&T at NCCU, Durham, N.C.
67. P. Vereen, T. Poteat, J. Bang. "TEM-EDX Analysis of Carbonaceous Nanomaterials in Ambient Air Originating from Brake Pads and Tires." April 13, **2012**, CS&T at NCCU, Durham, N.C.
68. M. Duchatelier, J. Bang. "Ambient PM2.5 Exposure Level around NCCU Community and Its Public Health Implications." April 13, **2012**, CS&T at NCCU, Durham, N.C.
69. D. Reaves, T. Poteat, S. Key, J. Bang. "Drosophila melanogaster Study of Non-Pigmented Adults due to Silver Nano Particle Exposure." April 13, **2012**, CS&T at NCCU, Durham, N.C.
70. H. James, J. Bang. "Nano Silicate Conjugated Polyethylene Glycol (PEG) Trimer for Sol-Gel Applications." April 13, **2012**, CS&T at NCCU, Durham, N.C.
71. J.J. Bang, "Prevalence of Natural and Engineered Ultrafine and Nanoparticles in Environment", Feb. 16, **2012**, Duke University, Nicholas School of the Environment, Durham, NC
72. T. Poteat, Z. Hendren, J. J. Bang. "Potential Impacts of Nano Silver Particle Exposure on Lung Physiology." February 23-25, **2012**, Poster presentation at Emerging Researchers National Conference, Atlanta, Georgia
73. T. Poteat, Z. Hendren, J. J. Bang. "Impacts of Nano Silver Particle Exposure on Surface Tension." November 19, **2011**, Poster Presentation at State of North Carolina Undergraduate Research & Creativity Symposium (SNCURCS 2011) at East Carolina University, Greenville, NC
74. J. J. Bang. "Engineered Nanomaterials in Ambient Air?." April 22, **2011**, Seminar at Virginia Tech, Virginia,
75. J.J. Bang, C.K. Silver, D. Reaves, S.T. Yeyeodu, N.Gilyazova, S. Witherspoon, G. C. Ibeanu. "Environmental and Human Health Implications of Exposures to Synthetic Nanomaterials." Second International Conference on Environmental Implications of Nanotechnology (ICEIN), UCLA, Los Angeles, CA. May 11-13, **2010**.
76. W. Druweay, A. Valladares, S. Chae, M. Wiesner, Y. Anderson, S. DeLauder, J. Bang. "Carbon Nanotubes (CNTs) for Clean Air and Water?" Second EPA-NCCU Symposium, Durham, NC. March 19-20, **2010**.
77. L. Lawrence, E. Salim, Y. Anderson, S. DeLauder, J. Bang. "Indoor Ultrafine Particulate Matters (UFP) Exposure during Outdoor PM Spike." Second EPA-NCCU Symposium, Durham, NC. March 19-20, **2010**. CA
78. S. Chettri, J. Bang. "Synthesis of Transition Metal containing Mesoporous Nanomaterials: Remediation of Organic Pollutants in Fluidal Media." Second EPA-NCCU Symposium, Durham, NC. March 19-20, **2010**.
79. J. Williams, Y. B. Anderson, A.O. Tokuta, J.J. Bang. "County Based Air Quality Survey in North Carolina: Aldehydes and BTEX Data from NATA 2002." Second EPA-NCCU Symposium, Durham, NC. March 19-20, **2010**.

80. A. Finley, III., W. Druweay, S.F. DeLauder, Y.B. Anderson, J. J. Bang. "Assessing the Level of Exposure to Ultrafine Particulate Matter (UFPs) from Traffic Origins." Second EPA-NCCU Symposium, Durham, NC. March 19-20, **2010**.
81. J.J. Bang. "Implications of Carbon Nanotube (CNT) Exposure in Public Health Perspective: CNT as another Asbestos?" 73rd Annual Educational Conference, National Environmental Health Association (NEHA), Atlanta, GA, June 21-24, **2009**.
82. L. Lawrence, J. Bang, Y. Anderson, S. DeLauder. "Human Exposure to Indoor Ultrafine and Nano Particulate Matter during Evening PM Spike and its Potential Health Effects." US-Korea Conference (UKC) on Science, Technology, and Entrepreneurship, Raleigh, NC. June 16-19, **2009**. Symposium Chair.
83. J.J. Bang, W. Druweay, Y.B. Anderson, A. Barnett, D. Kim. "Patterns of Ultrafine Particle (UFP) Deposition in Human Lung Alveolar Surface, UFP Size Distribution, and Physiological Responses of Respiratory System on Healthy Individuals during Indoor Cooking." International Society for
84. Environmental Epidemiology (ISEE) & International Society of Exposure Analysis (ISEA), 2008 Joint Annual Conference, Pasadena, CA. Oct. 12-16, **2008**. Session Co-Chair.
85. J. J. Bang, Y. B. Anderson, J. O. Battle, A. Finley, A. Eley, F. M. Stefan. "Patterns of Ambient Nano Particulate Matter (PM) Deposition in the Lung Alveolar Surface Areas of the People Residing at Heavy Traffic Intersections." The Air & Waste Management Association's 101st Annual Conference & Exhibition, Portland, Oregon, June 24-27, **2008**
86. A.J. Finley, J. O. Battle, J. J. Bang, Y. B. Anderson. "Implication of prospering nanotechnology in the current National Ambient Air Quality Standards: Ambient Particulate
87. Matters (PMs)." Southeast Collegiate Environmental Science and Health Symposium, November 13, **2007**, CDC and Prevention, Atlanta, GA.
88. J.O. Battle, A.J. Finley, J. J. Bang, Y. B. Anderson. "Dilemma in the measurement of Particle Matters (PMs) including Nanoparticulate Mattes: Contact Surface Area, Particle Count, or Mass?" Southeast Collegiate Environmental Science and Health Symposium, November 13, **2007**, CDC and Prevention, Atlanta, GA.
89. J. J. Bang. "Developing Your Project Ideas: Planning the Scope and Depth According to Context and Conditions", Collegiate Academy of the N.C. Academy of Science, annual research conference, November 10, **2007**, Durham, NC. Invited talk
90. J. J. Bang, Y. B. Anderson, D. Whitaker, P. Egeghy, Fu-lin Chen, R. Williams, R. Fortmann. "Temporal and Spatial Characteristics of PM and Gaseous Copollutants. Seasonal Studies in one Environmental Justice Community" The 17th Annual Meeting of the International Society of Exposure Analysis, Oct. 14-18, **2007** Durham, NC.
91. J.J. Bang, Y.B. Anderson, S.F. DeLauder, J. Battle. "Impact of Human Traffic on Spatial Distribution Patterns of Indoor Particulate Matter (PM)", National Environmental Health Association's 71st Annual Educational Conference & Exhibition for June 18-21, **2007**
92. Y.B. Anderson, R. Malhotra, S.F. DeLauder, M. Bradshaw, L. Smith, J.J. Bang. "Partnering for Environmental health education in EJ communities: A comparison of approaches", American Public Health Association 134th Annual Meeting and Exposition, Boston, November 8, **2006**
93. A.J. Finley, Jr., L. Lawrence, J. Battle, J.J. Bang. Y. B. Anderson. "Impacts of Human Traffic on Indoor Air Quality", 5th Annual NC OPT-ED Alliance Day, September 22, **2006**
94. J. Battle, L. Lawrence, A.J. Finley, Y.B. Anderson, J.J. Bang. "Impacts of Highway Mitigation Walls on Particulate Matter Dispersion Pattern", 5th Annual NC OPT-ED Alliance Day, September 22, **2006**
95. R. Malhotra, J.J. Bang, L. Smith, M. Bradshaw, S.F. DeLauder, Y.B. Anderson. "Community based studies-a GIS approach", Twenty-sixth annual ESRI International User Conference, San Diego, August 7-11, **2006**

96. J.J. Bang, Y.B. Anderson, M. Bradshaw, L.L. Smith, A. Lloyd, J.Arroyo, R. Malhotra, S.F. DeLauder, P. Muriuki. "Utilization of Community Characteristics for the Study Design of Community Based Monitoring Projects", U.S. EPA Community Involvement Conference in Milwaukee. Poster, June 16-20, **2006**
97. J.J. Bang, S.F. DeLauder, Y.B. Anderson, G.B. Saupe. "Utilization of Novel Material Synthesis for Decontamination of Organic Pollutants" April 10, **2006**, American Chemical Society, North Carolina Branch Conference, NCCU.
98. J.J. Bang, K. Arcaute, L. Adams, L. Ochoa, R.B. Wicker., "Cytocompatibility of complex polyethylene glycol (PEG) hydrogel constructs: Implications for layered manufacturing using Stereolithographie Apparatus (SLA)," **2005** MRS Spring Conference (March 28- April 1, San Francisco, CA)
99. L.E.Murr, K.F. Soto, E.V. Esquivel, J.J. Bang, P.A. Guerrero, D.A. Lopez, and D.A. Ramirez, "Carbon Nanotubes and other Fullerene-Related Nanocrystals in the Environment: A TEM Study." The Fifth Global Innovations Symposium on Materials Processing and Manufacture: Surfaces and Interfaces in Nanostructured Materials & Trends in LIGA, miniaturization, & nanoscale materials, J.E. Smugeresky & S.M. Mukhopadhyay, TMS, Warrendale, PA, **2004**
- 100.J.J. Bang and L.E. Murr. Microscopy and Microanalysis 2003, The VII InterAmerican Congress on Electron Microscopy. Aug. 3-7, **2003** symposia in San Antonio, TX. Symposium co-chair presentation: "Collection and Characterization of Ultra-Fine Airborne Particulates."
- 101.J.J. Bang, Lovelace Respiratory Research Institute, NM, May 16th, **2003** "Characterization of nanoparticulate matter in El Paso-Juarez ambient air"
- 102.J.J. Bang, U.S.EPA office of Air and Radiation, Mar. 5, **2003**, CERM, UTEP_ "Current status of Morbid Air", El Paso, Texas
- 103.J.J. Bang, "Ambient Air nanoparticles in El Paso-Juarez: Characterization and Source Delineation of the particles and Potential Impacts on Respiratory System.", The University of Texas at Houston, School of Public Health, Jan. 23, **2003**
- 104.J.J. Bang, "Health effects of ultra-fine particles on respiratory system". The University of Texas at El Paso, Environmental Science and Engineering, Sept.10, **2002**

PROFESSIONAL AFFILIATION & OTHER SERVICES:

- American Association for Aerosol Research since 2014
- American Water Work Association since 2014
- Haw River Assembly_Board of Directors since 2011
- Center for Environmental Implications of Nanotechnology (CEINT) since 2008
- Korean-American Scientists and Engineers Association (KSEA) since 2008
- National Environmental Health Association since 2007
- International Society of Exposure Analysis since 2006
- American Public Health Association since 2006
- American Chemical Society since 2003
- Sigma Xi, International Scientists since 2002
- Air & Waste Management Association since 2002

SKILLS:

- ELISA/Western Blotting
- Confocal Light Microscopying
- Dynamic Light Scatter (DLS) and zetasize/potentiometer for hydrodynamic diameter and surface charge
- XRD/TOC operation

- FTIR, UV-Vis, GC, AAS, HPLC
- Cell and tissue culture
- Electro Cardiogram (ECG) and Spirometer Operation and Interpretation.
- Nano Lung Surface Deposit Monitor/ SMPS and CPC operation for nanoparticle size and distribution characterization
- SolidWork/Auto CAD software for micro/macro scale device/equipment designing (tissue engineering applications)
- NIOX operation (pulmonary inflammation)
- PolyEthylene Glycol (PEG) hydrogel fabrication for scaffold generation
- PQ 200 PM Impactor for PM 10, 2.5, and 1
- MicroPEM/P-Trak/SidePak (for PM2.5 and PM0.1 in ambient air)
- ISC-AERMOD air dispersion modeling
- NITON XRF operation (heavy metal detection and analysis, NITON Inc.,
- Scanning Electron Microscopy (ESEM) operation for material characterization, Transmission Electron Microscopy (TEM) operation for air pollutant and material analysis, Con-focal light microscope and AFM for 3-D analysis of materials

CERTIFICATION STATUS:

- LC/MS 2010 Training certificate (organic toxicant analysis including pesticides, Shimadzu Inc., April 2006)
- ISC-AERMOD training certificate, March 3-4, 2008
- Aerosol and Particle Measurement, Air and Gas Filtration, University of Minnesota, Minneapolis Continuing Education certificates, August 14-18, 2006
- U.S. Medical Licensing Examination (USMLE) Steps I and II &CSA, 1998

ADVISEES:

- Advisees at NCCU: among over 20
 - Thesis Chair:
 - Tossin Odedere (Graphene Hybrid for Organic Substance Removal from Saline Water)Corliss Johnson (Titanium and Carbon Nanotubes as Nanomaterial Behavioral Markers, Pursuing industrial Career)
 - Haley Harrison (Optimization of MWNT-Ti Photocatalyst for Ballast Water Remediation, Admitted to Ph.D. program at Joint School of Nanoscience and Nanoengineering, 2017)
 - Theo Noussi (Ultrafine particulate matter exposure assessment and Land Use Regression, Admitted to Ph.D. program at Joint School of Nanoscience and Nanoengineering, 2017)
 - Tierra Poteat (Synthesis of Silver Titanium Nanohybrid, Graduating summer 2017)
 - Patricia Cline-Thomas (Pattern Recognition of PM Exposure to Pedestrians along a local Highway during rush hours)
 - Shawn Muslim (May 2015_Pursuing Ph.D. at Joint School of Nanosciences and Nanoengineering in UNC-G & NC A&T State University)
 - Natushia Harris (December 2014, offered as tech position at Virginia Commonwealth University, Richmond, VA)
 - Alexandra Valadares_Summer 2014, hired at Duke University
 - Seema Chettri (May 2010, admitted to Ph.D. program at North Dakota State University)
 - Lauren Lawrence (May 2009, works as high school teacher in Durham, NC)

-Thesis Committee:

- Olorunfemi Olasanmi (December 2014, in practical training)
- Jessica Barnwell (December 2013, works as a EPA contractor)
- U. Balami (December 2013, works at Biogene)
- Denis Reaves (December 2012, works as lab supervisor at NCCU)

COLLABORATORS/INSTITUTIONS:

- Collaborators: Ronald Mason and Ashutosh Kumar (NIEHS, RTP, NC); Hyunsook Shim (Radiology and Pharmacology, Emory University, Atlanta, GA). Michael Bergin (Georgia Institute of Technology, Atlanta, GA); Christopher Frey & Andrew Grieshop (NC State University; Civil, Construction and Environmental Engineering); Wei Liao (Department of Biosystems & Agricultural Engineering, Michigan State University); James Ryan, Dan Herr (Joint School of Nanoscience and Nanoengineering, UNC-Greensboro and North Carolina A&T State University); Mark Wiesner, Jie Liu, Rich Diguilio, Gabriel Lopez (Duke University; Civil & Environ Engineering, Chemistry, School of Environment, Biomedical Engineering, Nicholas School of Environment); Christopher Frey (NC State U, Civil and Environmental Engineering); Stephen Crews (UNC-CH, Medicine, Biochem & Biophysics); Volodymyr V. Tarabara (Michigan State University); Zachary Hendren, James Cunningham, Keith Levine, Andrey Khylstov (RTI at RTP, NC); Richard Baldauf, Peter Egeghy, Don Whitaker, Ronald Williams, Roy Fortmann, (EPA, NERL at RTP); Sangseob Lee (Kyonggi University, Korea); Ming Quyang (Donaldson Co.); Hyun Shim (Emory Univ. Medicine, CDC); Neil Arnold (Univ. Utah, Chemical Engineering); Eric Gigham, Joseph Kim (GlaxoSmithKline), Jorge Gardea, Ryan Wicker, Wen-Wai Li, and Lawrence Murr (Univ. Texas at El Paso, Chemistry, Mechanical Engineering, Civil Engineering, and Materials Engineering); Lim, TT (Nanyang Technological University, Environmental Engineering, Singapore). Sangseob Lee (College of Life Sciences, Kyonggi University, South Korea).

OTHER SERVICES:

- Environmental Health Work Group at North Carolina Central University (Lead): 2013- Present
 - Member, Board of Directors: Haw River Assembly: 2012- Present
 - Research Triangle Park (RTP) Bioscience and Biotechnology organizer: 2009- Present
 - Environmental Health work group at Duke University: 2012- Present
 - Graduate Faculty Committee at NCCU: 2007-Present
 - Faculty Senate at NCCU: 2011-2013
-